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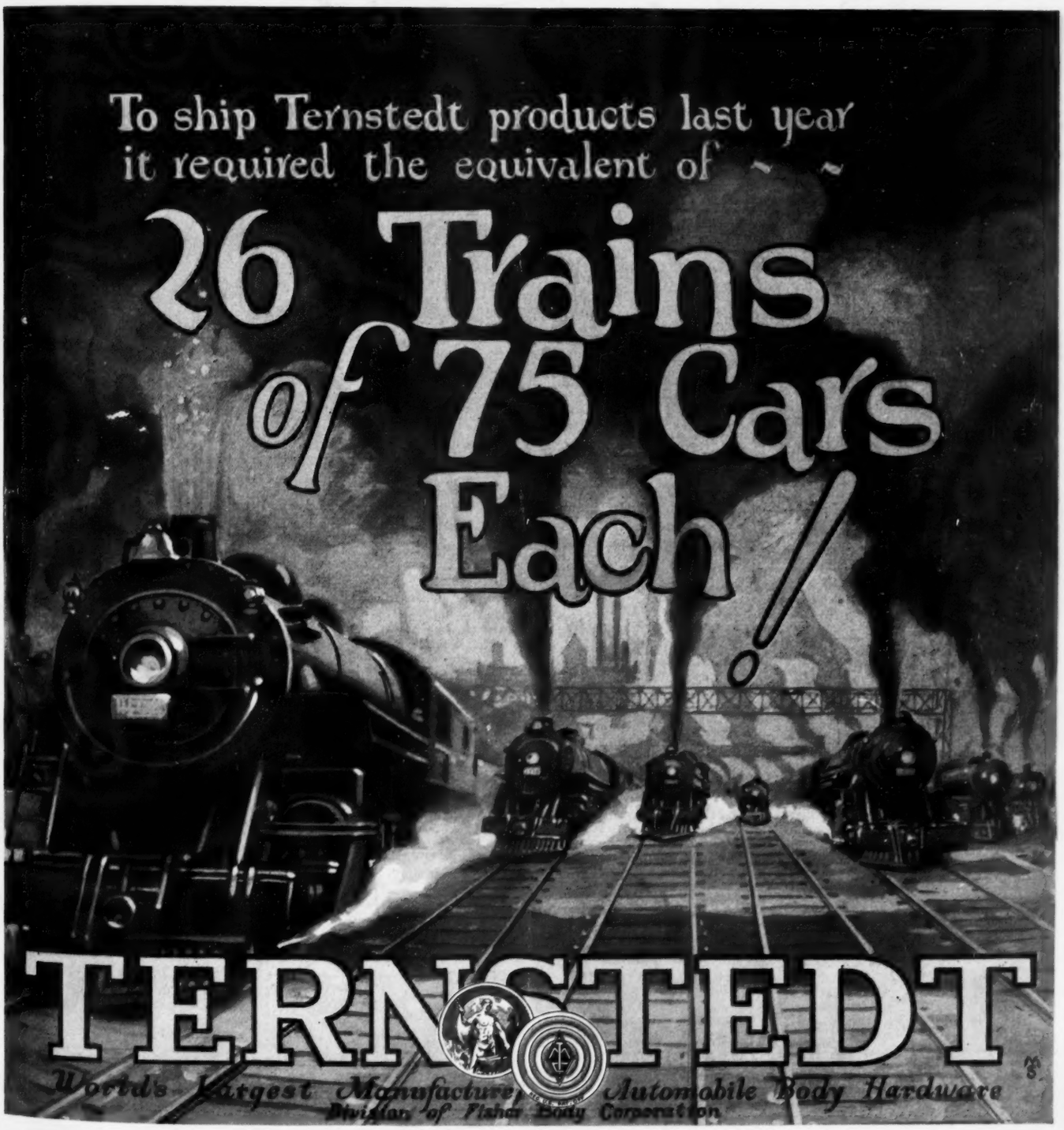
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AUTOMOTIVE INDUSTRIES

VOLUME 54 *Philadelphia, Thursday, March 11, 1926* NUMBER 10

Dealer Finance Resolutions Conflict With Some Factory Ideas

Manufacturers are in complete accord with dealers on certain phases of question, but many do not favor the non-recourse method.

By Norman G. Shidle

THE automobile manufacturers, as a whole, are not entirely in accord with the resolutions regarding retail financing recently passed by the National Automobile Dealers Association, but on many of the points the dealers are finding agreement with their stand by some of the car builders. The most definite divergence between general dealer and general manufacturer opinion exists on the question of recourse or non-recourse methods, most of the dealers very definitely favoring non-recourse financing, while a majority of manufacturers see greater benefits in the recourse plan. But even on this point, the dealer view has strong support from a few manufacturers. Opinion among the dealers, moreover, is not unanimously opposed to recourse financing, although a vast majority of them seem to be firmly behind the expression of the N. A. D. A. on this point which recommends "elimination of all dealer indorsement of customer paper as a means of removing a legal contingent liability," and adds, "this also includes elimination of all practices requiring the dealer to sign a separate repurchase agreement where his paper is taken without recourse."

The meaning and intent of that statement is not open to doubt. And a recent survey conducted by the Chilton Class Journal Co. covering several hundred dealers handling all makes of cars throughout the country bears out the idea that the N. A. D. A. resolutions properly represent the opinion of the retailers. Replying to a question on recourse or non-recourse, 75 per cent of the dealers answering stated their preference for non-recourse methods.

Generalization about factory belief in this matter is a little more difficult. Nevertheless every arrangement made by a factory with a finance company for handling dealer paper—with one exception—is either a straight recourse or a repurchase agreement plan. These factory actions in themselves clarify the general feeling among manufacturers pretty well.

But to see what effect the N. A. D. A. resolutions might have had on factory opinion we asked the sales managers of a number of representative companies to tell us what they thought about the retailers' recommendations. Replies indicated that while non-recourse financing has a few staunch friends at the factories, recourse methods are strongly favored by a majority of manufacturers today.

To evaluate properly the present automobile financing situation it is highly desirable that both factory and dealer opinion on the more important points at issue be understood clearly. Fundamentally the two have the same objective—the profitable disposal of a

GENERALLY speaking, the manufacturers and dealers are divided on the question of retail financing methods. Most of the manufacturers—though by no means all—favor the recourse plan, whereby the dealer is required to indorse the buyer's notes and take the responsibility of repossession if the instalments are not met. The dealers, on the other hand, prefer the non-recourse method, where the finance company in accepting the paper assumes all responsibilities for repossession and resale of cars turned back by default of payments

maximum number of passenger cars. But for definite reasons of self-interest, the two groups differ in some instances as to the best means of achieving that given end.

Since the dealer position can be assumed to have been clarified pretty well in the resolution passed by the N. A. D. A. at its annual meeting in Chicago in January, a study of manufacturers' reactions to those recommendations forms a good starting point for analysis of the present status of the financing question.

Objections to Non-recourse

The division of the two groups as regards recourse and non-recourse has been outlined. Those manufacturers who object to non-recourse do so, it would appear, chiefly because of the higher ratio involved. A list of factory objections to non-recourse, briefly summarized, might appear something like this:

1. High rates. The factory makes very strenuous efforts to reduce the cost of the car by a few dollars and it is neither fair nor economically sound for the dealer to add ten or twenty dollars to the price paid by the time buyer by using non-recourse plans which always involve a higher charge to the customer.
2. The belief that non-recourse tends to promote wild-cat terms because it relieves the dealer of responsibility and makes it possible for him to sell cars to men whose credit is not good.
3. Dealer should be entirely responsible for business he does and should not shift that responsibility by adding to the cost of the car for the customer.
4. There should be some penalty attached to poor judgment of a customer as a credit risk other than the finance companies refusal to continue to do business with the dealer.
5. The used car market is demoralized when repossessed cars are dumped on the market by finance companies.

The objection of high rates is the one met with most frequently in analyzing the objections of manufacturers to non-recourse financing, although the fact that most of the wild-catting in the finance business has been on a non-recourse basis undoubtedly has been an important influencing factor.

Dealers' Side of Question

The argument against non-recourse as propounded by those opposed to this type might, of course, be carried much further than the few brief objections mentioned. But those enumerated serve to indicate the chief faults non-recourse financing seems to have in the eyes of the car builders.

In favoring non-recourse and in opposing recourse methods, on the other hand, the dealers bring up the following arguments:

1. The dealer is not equipped to handle credit investigations as well as an organization like a finance company whose very life depends upon a proper handling of credits.
2. Since the dealer is not organized to handle credits and collections efficiently, his costs and losses would be relatively great.
3. The dealer stands chances of serious losses if he fails to handle credits and collections efficiently when he is operating with a recourse plan. Thus he may fail even though he handles the rest of his business with reasonable efficiency and sells cars in good numbers.
4. Non-recourse charges are higher because the finance company assumes the obligation and responsibility for credit investigations and collections among other things. The customer pays that extra charge. With a recourse plan the dealer assumes the credit and collection expense. The customer gets a lower rate, but the dealer has to pay—directly or indirectly—for the costs involved in credit and collection work.
5. The added financing charge caused by non-recourse methods doesn't appreciably affect the number of cars sold one way or the other. Consequently, why should a dealer assume an added financial obligation when he doesn't have to?

Again, it is obvious, only the sketchiest kind of outline is given of the reasons for the dealer attitude, but the entire recourse and non-recourse argument has been going on for so long and has become so familiar to most automotive men that little is neded here except to emphasize those points which seem to be influencing the various groups most at the present time.

Conservatism Chief Requisite

One thought has not had sufficient emphasis, however, in any of these discussions, although it has been mentioned here from time to time. An efficiently operated, soundly financed and conservatively handled non-recourse business may, quite conceivably, be much safer from the standpoint of both the manufacturer and the dealer than a recourse business handled only for the benefit of the finance company. *And the converse is just as true.*

Greater progress might be made in the whole discussion if more emphasis were laid on conservatism and soundness of operation and less on the form of the plan itself. At the risk of bringing down on ourselves a barrage from both camps, we will venture the statement that neither the recourse nor the non-recourse plan of financing has inherent in its form qualities which will prevent abuse nor insure through its mere form profitable results from the standpoint both of the manufacturer and the dealer. Either type of company easily could be run to the detriment of the entire trade—and, by the same token, either type probably can be run in such a way as to benefit the entire trade.

The effieiency of operation is more important than the form itself.

But there is no chance of settling the recourse vs. non-recourse argument here. The positions of the dealers and the manufacturers in relation to the two plans merely can be clarified. There we may leave that phase of the question.

Subsidies are Opposed

The next important point in the dealer resolutions which concerns manufacturers particularly is the recommendation which opposes subsidies by manufacturers to finance companies. On this point many manufacturers are in agreement with the dealers. Obviously, those car makers who do give subsidies in connection with the finance companies' arrangements are not in accord with the dealer ideas on this point. That all car makers do not favor subsidies is shown clearly by a statement which comes from the sales manager of a leading producer of high grade cars who says:

"We deplore the necessity for the resolution regarding subsidies."

Another important sales manager, discussing the same point, writes: "The practice of manufacturers subsidizing finance companies is open to question, for subsidies can be used to knock down rates to a point where the amount charged the customer will not on the average pay financing costs and a reasonable financing profit. But subsidies have another purpose, which was their main one, prior to the last few months at least. Manufacturers saw the necessity of providing financing service for all their dealers. From

THE automobile retail financing situation has been for some time in a state of flux and probably will remain in that state for some months to come.

Except as to recourse and non-recourse, there is no great line of division between the general dealer views and the general manufacturer views on the subject.

Responsible representatives of both groups are urging strongly that terms be held to conservative limits and that down-payments be made sufficient for safety.

With a few exceptions there seems to be no tendency on the part of the manufacturers to urge extremely liberal instalment terms in an effort to have dealers move cars and permit higher production levels.

This article tells you what is going on at the present time in the minds of the dealers and manufacturers as regards finance methods.

the national organization standpoint, some dealers' business was good and profitable, other dealers' business was not.

"In thickly populated sections where the cost of administration was low, competitive rates would yield the national finance company a satisfactory profit, but in sparsely settled sections of the country where administrative costs were high, these same rates would produce a loss instead of a profit, and where national service is offered rates cannot be regulated geographically when the credit standing of the individual customer is not in question.

"As a whole I believe that subsidies are bad because they are so susceptible of abuse and of what amounts to misrepresentation by the customer. However, in some cases I know they have not been abused and therefore if they are condemned it must be with reservations."

It cannot be said that there is any overwhelming sentiment among car makers in favor of subsidies to finance companies and the indications are that this practice is more likely to recede than to spread more widely, the chief objection to it being the same as that opposed to inside trade-in discounts, namely, that it comes very close to resulting in misrepresentation.

Whether or not dealers should be allowed absolutely free choice of the finance companies with which they shall do business is the third point on which a considerable difference of opinion exists within the industry. Again, however, the lines are not drawn distinctly between manufacturers and dealers, as a number of the latter group incline toward the dealers' view in favor of freedom of choice.

The retailers, of course, believe that they should be permitted to use any finance company they wish. This thought was expressed in another of the resolutions passed by the N. A. D. A. which recommended simply "that the automobile dealer be allowed complete freedom of choice in his selection of the finance company with which he is to do business."

The disagreement of several factories with this resolution is evidenced by their attempts to force their dealers to use a particular plan arranged by the factory with a particular finance company. Some car makers have been more successful in achieving this end than others, but complete success cannot be said to have crowned many of the efforts along that line. It is to be recognized, also, that not all of the factories which have made special arrangements with a single finance company have really tried to force the use of that particular plan. In several cases the attitude taken is that the plan has been provided in case the dealers need it and want to use it, but that if the individual dealer can do better with some local company the factory doesn't care one way or the other. The factory plan in these instances is provided as a service for those dealers who might otherwise be unable to get as good arrangements.

An executive of one factory which has a special factory retail finance plan, after discussing the relation of dealers to that plan, says, for example: "Dealers of course, are independent and free agents and will do as they think best; that is their right and their prerogative."

Executives of some factories, of course, believe that the dealer should not choose for himself; that he should use the plan provided by the factory. One chief sales executive, who believes this, writes that his company has had great difficulty in getting the wholesale and retail organization to use the factory finance plan. "Few of our distributors and dealers give it their support," he says, but points out the following reason for his belief that the factory plan should have the wholehearted support of the distributing organization:

"I think it is generally true that rules sometimes have to be made and regulations imposed because they are good for the whole army even if Reilly, a buck private, feels they impose something of a hardship on him; therefore we believe that our distributors and dealers all should support one finance corporation and we will assume the obligation ourselves of seeing that their rates are fair and their service good.

"Any other policy means that some of our customers in some localities are going to be overcharged for finance accommodation, and inasmuch as we conscientiously try to operate on an equal treatment basis, there is no other that is substantially safe."

Another important sales executive expresses his opinion on this point by that statement that "the automobile dealer should be allowed complete freedom of choice in his selection of a finance company provided he does not penalize his customers in rates or terms as a result."

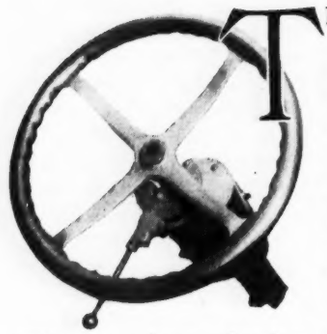
A good many factory executives, it would seem, favor the idea of having their dealers utilize a single finance plan provided by the factory, but relatively few of these same executives believe in attempting to compel acceptance of that plan by strong-arm methods. From a practical standpoint such methods would be doomed to failure, of course, except in the case of those companies whose franchise is extremely valuable in the eyes of the dealer, while from a psychological standpoint the forcing process is of doubtful value to say the least.

In the general application of any factory policies of this kind, difficulty always is likely to arise because the quality and character of the dealers involved varies so greatly. A certain proportion of the dealer organization is almost certain to lack the ability to work out many intelligent plans for itself. A degree of paternalism seems necessary to any practical achievement from the factory standpoint. But the highest development of an individual dealer's organization is rarely to be found through paternalistic methods and those retailers who know how to handle their business with a high degree of intelligence and efficiency often resent being told what they shall or shall

(Continued on page 464)

New Fageol Gas-Electric Chassis Has Westinghouse Drive

Two electric motors and Hall-Scott six-cylinder engine form powerplant. Specially designed steel body used. Maximum road speed about 35 m. p. h.



Steering column, showing the field controller

THROUGH the cooperation of a number of companies prominent in the transportation equipment field, a new gas-electric bus has been developed which made its debut before the public recently with a 2500 mile demonstration run, starting at St. Louis and leading through Terre Haute, Dayton, Columbus, Toledo, Cleveland, Detroit and Indianapolis. At the latter city the bus was demonstrated during the meetings there in January of the Central Electric Railway Association and the American Electric Railway Association.

The bus referred to has a Fageol chassis equipped with a Hall-Scott six-cylinder engine of 4¼ in. bore and 5½ in. stroke. Chassis features are essentially the same as on the standard Fageol gasoline coach, the low build of the chassis being particularly noticeable. The wheelbase is 230 in. and the wheels carry 34 by 7 in. pneumatic tires (duals in the rear).

Connected to the engine through a flexible coupling is a Westinghouse generator with a "continuous" rating of 33 kw. It is essentially a self-excited unit, but a small amount of separate excitation is furnished by the 12-volt starting and lighting battery, to ensure quick building up of the generator voltage under all conditions. Good commutation is assured by the provision of interpoles.

Dual Drive Rear Axle

Two Westinghouse motors are mounted side by side near the middle of the chassis and connected through two shafts to a dual drive rear axle. An alternate arrangement consists in mounting the two motors in tandem on one propeller shaft driving a standard type of rear axle. This latter arrangement is said to be entirely satisfactory. It corresponds in most respects to a single motor drive but is probably preferred to the latter on account of the possibility of using standard motors, and it also has the advantage that the failure of one motor would not incapacitate the bus.

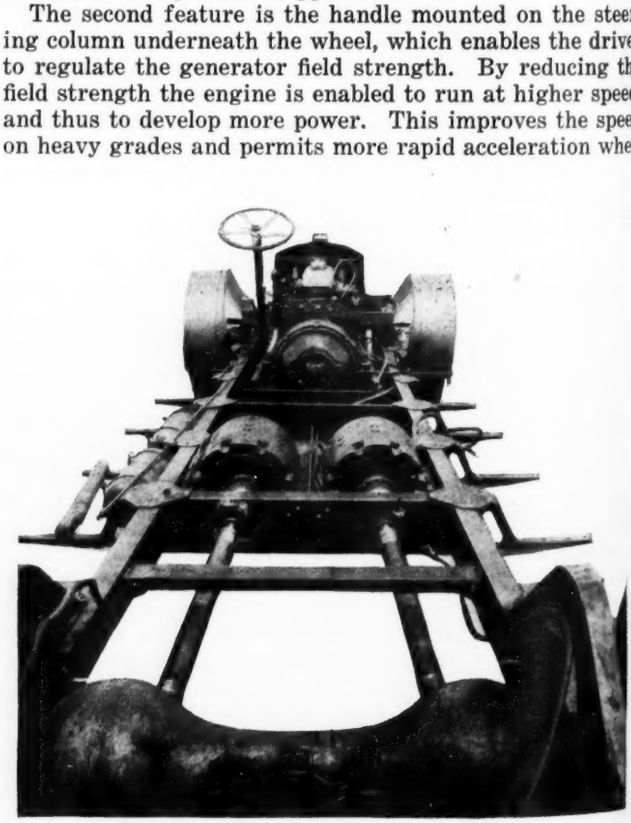
Ventilating air passes through the generator and the motors in a direction parallel to their shafts. There are no openings in the housing toward the road, and special provisions are made to prevent dirt and water from getting into the commutators.

Both the generator and the motors are equipped with ball bearings, which are lubricated through Alemite fittings accessibly located. Provision is made underneath for the inspection of the motors, which do not project above the floor level. The generator rises slightly above the floor level, but at the extreme front of the body, so that it does not interfere with the path of the passengers. The unit is easily accessible by removing a metal covering.

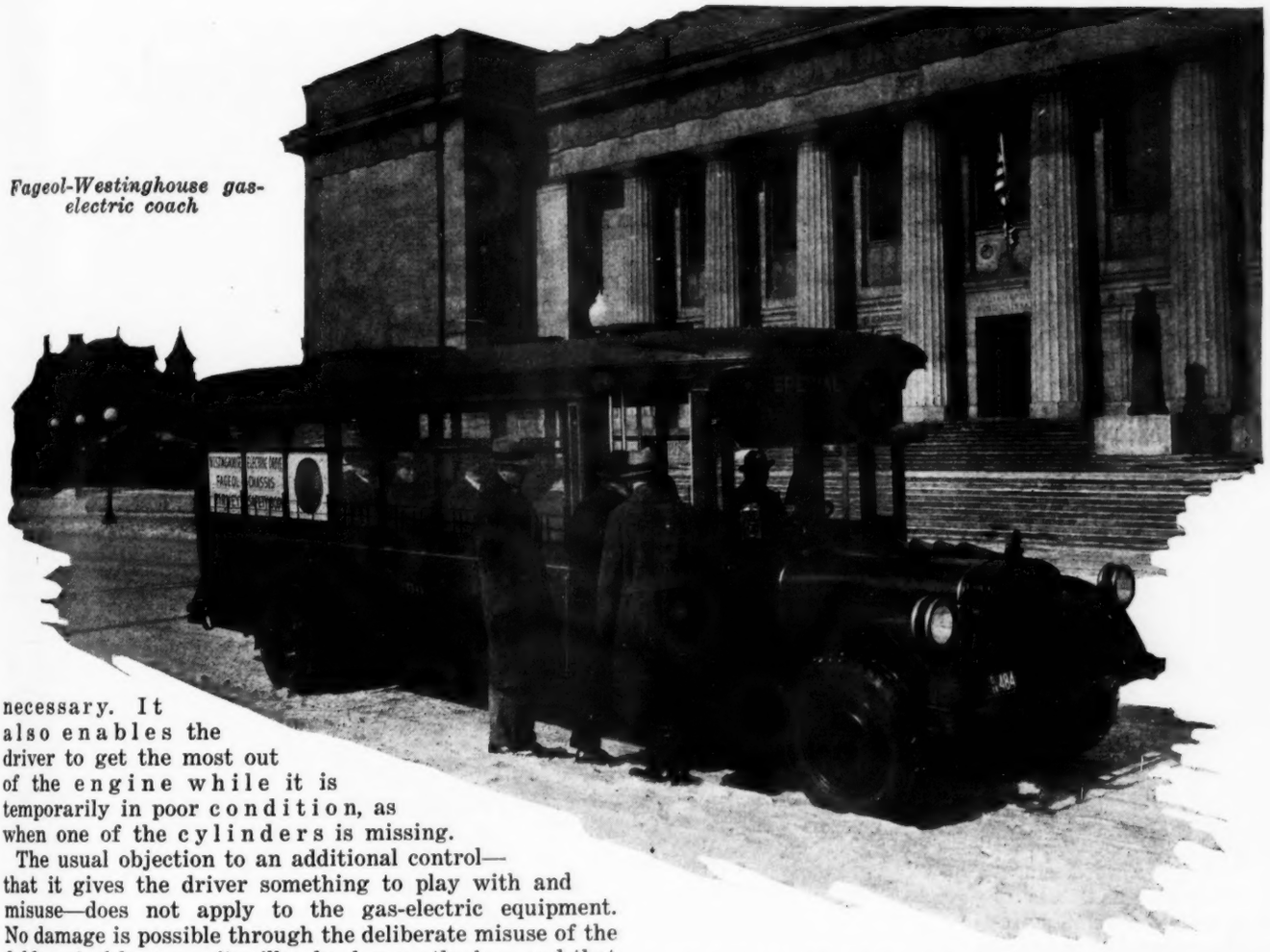
Two Features of Control

Speed control is effected mainly by the accelerator pedal. Two features of the control are noteworthy. A small amount of current for field excitation is taken from the starting and lighting battery whenever the power is on, but whenever the engine is idling this supplementary field circuit is broken by a contactor mechanically connected to the accelerator pedal. Thus no current is drawn from the battery except when needed, and there is no tendency for the bus to creep when stopped.

The second feature is the handle mounted on the steering column underneath the wheel, which enables the driver to regulate the generator field strength. By reducing the field strength the engine is enabled to run at higher speed, and thus to develop more power. This improves the speed on heavy grades and permits more rapid acceleration when



Rear view of chassis, showing relative positions of engine, generator and motors



Fageol-Westinghouse gas-electric coach

necessary. It also enables the driver to get the most out of the engine while it is temporarily in poor condition, as when one of the cylinders is missing.

The usual objection to an additional control—that it gives the driver something to play with and misuse—does not apply to the gas-electric equipment. No damage is possible through the deliberate misuse of the field control lever, as it will only slow up the bus, and that is contrary to the inherent desire of most drivers of motor vehicles today.

The main controller provides for the various motor connections. Positions are provided for forward operation, an "off" position, for electric braking and for reverse. These are so arranged that the controller handle is moved in the direction which corresponds to the desired direction of travel.

The controller is hand operated. It is mounted under the first cross seat directly behind the driver. The operating handle is located where the gear shift lever is found on the ordinary vehicle. Provision is made so that the handle cannot be moved from forward to reverse, or vice versa, in one movement. It can be moved in a single motion from forward to "off" or reverse.

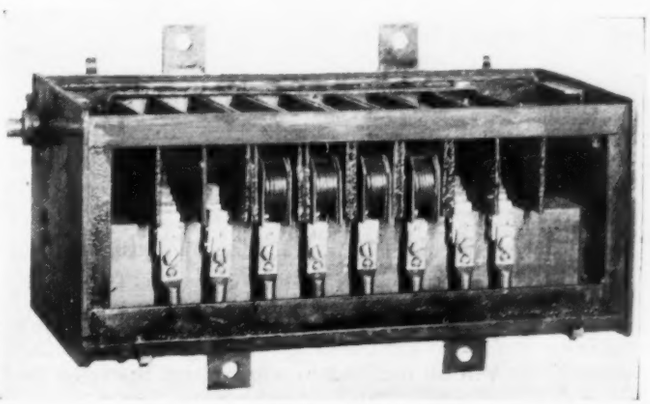
When the controller is set for braking the generator is entirely disconnected from the motors, which latter act as generators and supply current to a grid resister. The action is said to be smooth and powerful. Three steps allow the braking effect to be applied gradually. As the braking effect varies rapidly with the speed, it is almost impossible to slide the wheels with dynamic braking.

The steel body of the bus was built by the American Car Co., St. Louis, after designs of Charles O. Birney. Its plush-covered, deep-cushioned seats are arranged in two rows, on opposite sides, leaving an aisle between, while the rearmost seat extends the entire width of the body.

The interior is finished in mahogany, except for the headlining, which is in white and has the lighting fixtures set in it, in rows over the seats. The folding door at the front right hand side of the body is operated by air controlled from the driver's position. A farebox stand is located at one side of the right hand doorway. The door on the left hand side of the operator is hand-operated and is provided principally for emergency purposes. A small drop sash is arranged in this door.

We are informed that the bus described, which with a steel body and carrying two passengers and their baggage weighs 15,000 lb., has repeatedly traveled 5.5 miles per gallon of gasoline over straight, level roads, which performance is said to compare favorably with that of a similar geared bus having a gear ratio suitable for city service.

The maximum safe speed, limited by the armature banding, is 35 m.p.h., and this speed was easily reached in the tests. In cross-country running a speed of 30 m.p.h. was maintained fairly uniformly.



Main controller with cover removed

South African Market Responds to American Sales Appeals

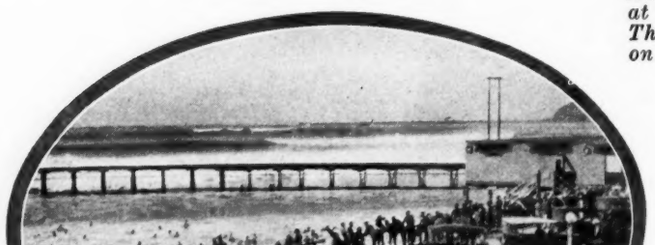
In temperament and customs South Africans differ but little from Americans so that, with slight modifications, identical selling methods may be employed.

By M. Edward

UNDOUBTEDLY America leads in the art of sales promotion by means of the written word. This is a fact that impresses itself upon any visitor interested in the automotive industry—and one that leads him to realize the good intentions behind the publicity efforts in the foreign field.

The written word is sent to countries thousands of miles away and in many instances its job of sales promotion is carried out well, but there is only too often a loss in efficiency due to lack of knowledge of the country in which the system is employed. Let us take for the purpose of this article the promotion of sales in British South Africa, an automobile territory thousands of miles away in which American cars, trucks and accessories are well represented.

At the outset I would like to make it clear that the written word has been used to great effect in South Africa, and has without doubt helped distributors and dealers in the planning of their publicity campaigns; but I propose to show how a great deal of money, valuable time and literature is wasted through insufficient knowledge of the territory. The executive sitting at his desk in America planning a sales promotion campaign for South Africa is at a disadvantage. Naturally he will be inclined to work along the lines that have proved so successful in America.



Automobiles parked along the beach at Durban, on the Indian Ocean. This is an important municipality on the east coast of the Union of South Africa

HERE are important parts of the message brought to American manufacturers interested in developing the South African automotive market by a man who is intimately acquainted with the conditions there present.

Advertising copy which is successful in America, with slight modifications, usually will be equally successful in South Africa.

South Africa is a bi-lingual country, Important literature should be furnished in Dutch as well as in English.

Reduction of postal rates this year to pre-war levels makes campaigns by first-class mail both possible and profitable.

Stunts have been a bit overdone, but South African dealers are glad to get aid for other types of merchandising plans.

Mr. Edwards is a native of South Africa and his reactions to present forms of dealer relations will be useful to manufacturers in preparing export sales promotion literature.

It is taken for granted that he has before him vital statistics regarding population, area, buying power, and the number of motor vehicles in use—these are easily obtainable. But he has not the local atmosphere. This cannot be conjured up at will, and is often difficult to visualize even after reports by visiting representatives have been analyzed. For the factory representative often gets a rather superficial idea of the foreign field—does not always strike down deep enough.

If I were a factory executive planning a sales promotion campaign for South Africa I should first of all be guided by the advice of my distributors, or dealers, in all territories. I should write each concern a letter explaining that it was the object of the factory to help them in their territory, requesting details of any local peculiarities. A full range of literature including sales letters and schemes for the aid of domestic dealers, together with proofs of all newspaper and magazine copy, should be forwarded with a request for constructive criticism. The aid given to domestic dealers should be made clear by the factory executive, who should at the outset state whether financial assistance is given for territorial advertising done by dealers.

An endurance test in South Africa. The driver, in an American Hupmobile, is taking the Heidelberg Drift (ford), in the Vaal River district, south of Johannesburg, at 55 miles an hour. All traffic over this road must ford the river, as there is no bridge

The South African distributor would probably reply that he would like all advertising to be paid for by the factory, but allowance for this usual world-wide and human request must of course be made. What has to be borne in mind all along is that the written word has to be transplanted, and who pays for it is really outside the scope of this article. The line of least resistance is simply to send over all the factory literature on hand, and to place any scheme for newspaper publicity in the hands of an advertising agent in America, to be planned out on American national lines.

The possibilities of the printed word are just as great in South Africa as in America because in temperament and Government the people are not so very different. But it is a waste of time and money to send over literature dealing with purely American matters and expect the news thus distributed to impress the prospective customer in South Africa. A very great deal of this sort of literature is sent over. The automobile sections of the daily and weekly newspapers in South Africa are just as open to interesting news carrying publicity value as in America—but the news has to be of national importance. The fact that Mr. Jones, of Syracuse, has operated his "Standard Six" for fifteen years, and has traveled 500,000 miles without having anything done except the valves ground, does not carry much weight. The story will find its way into the crowded waste-paper basket of the busy editor. But the story of a cross-country speed or endurance run by some well-known driver over some difficult roads and trails will appeal, and may be eagerly grabbed up by the space-filling editor.

And now as regards actual advertising. In many cases the wrong publications are decided upon. There are very few, if any, publications in South Africa that can lay claim to national circulation. One such is just being started, and it is really the first. That is why copy sent by American advertising agents to publications representing themselves as national is so often wasted—or at any rate localized.

It is not suggested for one moment that advertising campaigns should not be run by American agents—but cooperation should be sought by these agents in requesting all dealers throughout the territory to submit their ideas of the mediums that will be of greatest assistance. This sounds a simple and obvious thing, but it is so often ignored that I have no hesitation in mentioning it.

Having made certain that newspaper and magazine publicity has been properly cared for, the factory executive can rest easy regarding the assistance that will be given to his copy in the news columns of the papers. This will be taken care of by the dealers themselves, aided by stories of the type mentioned above. The type of advertising copy generally sent out by automobile manufacturers is admirable, and most of it is applicable to South Africa, with the same exceptions holding good as in the news stories. Dealers appreciate American-made copy. To be quite frank, it is as a rule much better than their own, and they know it.

Any campaign that has proved good in sales promotion in America should be immediately submitted to South African dealers for comments and advice. An idea may work out splendidly with slight modifications made necessary by local conditions. Further, news of campaigns of any kind instituted by South African dealers should be sought for by manufacturers, with a view to getting a more concise line-up on the situation and progress.

The annual automobile show at Johannesburg is one of the big events of the year for motorists and dealers in South Africa and American vehicles always occupy a large portion of the space

It will be found that there is suprising activity, although in many cases the campaigns and stunts staged are simply adaptations of those that have made good in America. But it is interesting to know that most of these ideas have been obtained from American trade magazines, and not from the factory. This should serve as somewhat of an incentive to manufacturers to keep dealers better informed. It would be a good idea for manufactures to make certain that all their foreign representatives regularly receive copies of well-known automotive trade magazines.

A very important feature that has been missed by many is that South Africa is a bi-lingual country. Dutch is taught in the schools as well as English, and in some districts it is spoken and written almost exclusively. It is suprising that very few dealers have gone to the trouble of advising the factory that literature of importance should be provided in both languages.

Those who have done so have made good in the country districts, for there is no more courteous gesture than to put oneself out to address the customer in the language he most generally uses. Perhaps the trouble of reprinting literature accounts for the little use made of this necessary feature in helping to put across the "written word." Coming as a suggestion to the dealer from the factory more attention would doubtless be paid to it and a very big step forward in a sales promotion campaign would thus be made.

The printing of the literature can be done in South Africa at the order of the factory, but this is a detail. For some districts it will be better if the publicity is printed in Dutch and English together—that is to say, making the copy attractive to English and Dutch speaking prospects at the same time. In other districts literature printed all in Dutch or all in English will be best. The same applies to advertisements for newspapers. This is where local knowledge is required, and the dealer should be requested to supply it.

Direct Mail Campaigns

And before we come to such aids of the written word as window displays and stunts, a little about direct mail campaigns. The South African prospect, Dutch or English, is just as likely to throw away the second-class mail matter and read the sealed personal letter as the American. But until 1926 the personal letter idea was costly, because of a four-cent postage rate. However, postage has now been put back to where it stood in pre-war days—two cents—and the renewal of this kind of sales promotion may be fostered in South Africa by the executive planning the far-away campaign.

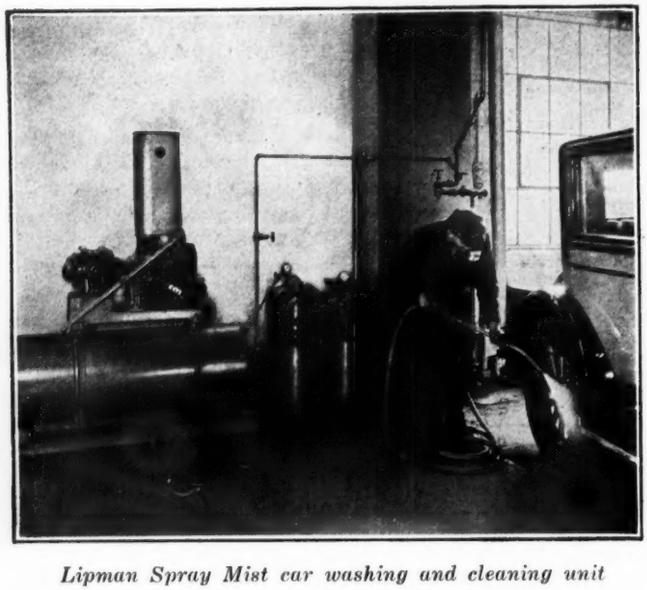
South African dealers are just awakening to the value of good window displays for cars, trucks and accessories. They should be helped in the awakening by the manufacturer. Encouragement in this sphere is very much needed and what is being done in America may be carried out on a smaller scale in South African cities and towns. It cannot be said that much encouragement is needed in regard to stunts. Rather has this side of things been overdone. The public has been thrilled to the point of indifference by speed records across the almost trackless wilds, races with railroad fliers, gasoline economy competitions, hill-climbing wonders and a thousand and one displays of the abilities of the modern automobile.

These stunts, while following in general character many of those undertaken in America, have been extraordinarily varied, severe, and thrilling and it would seem that there remains little to be done by the manufacturer in this direction. Rather might he be able to show the best means of capitalizing the results—of telling the public. This, however has also been very well done in a national as well as a local way.

In conclusion, I can say that the dealer in British South Africa is willing to learn. He certainly does not think that he knows everything, and the executive busy on sales promotion plans for this foreign field can be certain that his ideas and advice will be well received. But it would be just as well to try and get some idea, first, as to what is most likely to be of real use.

He has a mighty difficult job—planning for a strange country thousands of miles away; but it can always be borne in mind that South Africa has already been educated to the use and acceptance of many American ideas in sales promotion, and that 90 per cent or more of the motor vehicles in use are from the United States and Canada.

"Spray Mist" Car Washing Unit



Lipman Spray Mist car washing and cleaning unit

THE Lipman Pump Works of Rockford, Ill., have placed on the market a new Spray Mist car washing and cleaning unit. It is said to clean a car—inside and out—in from 15 to 30 minutes at a very moderate operating cost. The inside of the car is first cleaned by a special air nozzle, which, it is claimed, will do a more thorough job upon the upholstery than any vacuum system, and without the slightest wear and tear. Then the motor and all grease encrusted parts are cleaned with a special kerosene gun, which removes grease and dirt. A fine water spray, soft as fog and equally penetrating, loosens the dirt on the chassis and body; a second bath with a heavier spray completely rinses off all dirt and grit without damage to the finish. Finally, a special air gun removes all water residue, making it necessary to chamois only the glass and the finish. To make the job complete, penetrating oil is sprayed onto the springs with sufficient pressure to lubricate every leaf.

The mixing is accomplished by special, patented valves, which insure thorough atomization. The special construction of these valves eliminates the necessity for two hose lines to the gun, thus materially lightening the work of the operator. The water gun is swivel jointed, making it possible to reach any part of the car without kinking the hose.

Air pressure is furnished by the Lipman four-cylinder compressor, gear driven by a 3 hp. motor, provided with automatic cutout and unloader. The compressor is water cooled; the crankshaft rotates on ball bearings.

Sleeve Valve Engines—*Elements of Design and Performance Characteristics*

Additional power required to operate sleeves is too small to effect mechanical efficiency. Knight and Burt types reviewed.

PART II

By P. M. Heldt

ONE of the objections that has been made to the Knight engine is that a great deal of power is required to operate the sleeves, and that, in consequence, the mechanical efficiency must be low. Owing to the fact that the pump and magneto or generator are generally driven by the same train of gearing, no determinations of the power absorbed by the sleeves alone have been made, but Prof. Riedler made a determination of the power absorbed by the sleeves and accessories combined.

An electric motor was rigged up in line with the eccentric shaft and connected thereto by a coupling. The eccentric shaft thus had two independent sources of power and was driven by one or the other, or by the two together. The chain wheel had a slight degree of freedom on the shaft and was provided with an electric contact point which would come into contact with another contact point carried on a rigid arm on the shaft if the chain ceased to drive the shaft and the chain wheel on the eccentric shaft therefore lagged behind. This condition was brought about by gradually increasing the voltage applied to the terminals of the electric motor. When the contact was established, indicating that all of the power for driving the eccentric shaft was being supplied by the electric motor, a lamp flashed, and readings were taken of the electrical instruments in the motor circuit, from which readings the power required for driving the shaft could be calculated. A 96 by 130 mm. four-cylinder engine at 2000 r. p. m. developed a little over 40 hp. on the brake, and consumed exactly 2 hp. on the eccentric shaft. The power used to drive the shaft varied almost in direct proportion to the speed of the engine when operating under full throttle.

Sleeves Require More Power

The power required for operating sliding sleeves is, of course, much greater than that required to operate poppet valves, but the total is so small that it does not lower the mechanical efficiency of the engine seriously. It has sometimes been argued that poppet valves must absorb a great deal of power because the exhaust valves have to be lifted against a pressure of 50 or 60 lb. p. sq. in. While it is true that this pressure exists in the cylinder at the beginning of the exhaust period when operating under full throttle, the valve does not have to be lifted against it any appreciable distance, for immediately it is off its seat the difference of pressure on its opposite sides is greatly reduced, and thus only a small amount of power is absorbed. That required for compressing the springs is, of course, largely returned during the closing period of the valve.

Probably of more importance than the loss in power due to sleeve friction in normal operation is the added starting friction. Owing to the large area of the surfaces in contact, it is easily conceivable that, when the oil on these surfaces is congealed, their frictional resistance adds materially to the starting torque required.

THIS is the second and last installment of the article on sleeve valve engines, which is from a paper presented by Mr. Heldt at the February meeting of the Dayton Section, Society of Automotive Engineers.

Part I of the article, dealing mainly with the early history of this type of engine and its commercial development here and abroad, appeared in last week's issue.

Detonation Characteristics

The claim has often been made that in the sleeve valve engine there is less tendency to fuel knock than with engines having side pockets. If the theory that knocking is dependent upon the distance from the point of ignition to the farthest point of the combustion chamber is correct, then this claim should be well founded, for with the compact form of the combustion chamber in most Knight engines, and the spark plug located in the center of the cylinder head, it is hard to see how the most remote portion of the combustible charge could be brought much closer to the points of ignition. The absence of the equivalent of an exhaust valve head should also be a help in this connection.

When the Knight engine was first placed on the market many engineers professed themselves to be skeptical regarding the possibility of effectively lubricating the long sleeves under all conditions, but long experience has shown that their apprehensions were ill-founded and that all difficulties of lubrication can be overcome by careful design.

The early Knight engines had splash lubrication, like practically all other automobile engines of the period. The lower ends of the working parts had oil thrown onto them by dippers secured to the connecting rods, and the vacuum existing in the combustion chamber during the inlet stroke tended to draw the oil up toward the top of the sleeves. However, the suction in the combustion

chamber is greatest when the throttle is nearly closed and the engine is running under small or no load, when comparatively little lubricant is required, whereas when the throttle is fully open there is little vacuum in the combustion chamber and less oil is drawn up to the upper ends of the sleeves, and these are the very conditions when a copious supply of lubricant is desirable.

Knight sought to remedy this difficulty by making his splash troughs controllable. The troughs were provided with a pivot on one side and the other side was connected through a suitable linkage to the throttle lever, in such a way that as the throttle was opened the trough was raised, the quill dipped into the oil to a greater depth and the splash, in consequence, was more energetic.

Force Feed Lubrication Used

Practicallly all modern Knight engines have force feed or pressure lubrication, the same as poppet valve engines. The same fundamental difficulty of a lesser tendency of the oil to travel upward inside the cylinder under conditions of full throttle operations exists with this system, and this is said to be one of the reasons why, until recently, little success was achieved with Knight engines in races. For in racing the throttle is kept wide open practically all the time, and the force tending to induce upward flow of the oil is very slight. In fact, one driver who has had some experience with Knight engines in speed work claims that, in order to get the most out of such engines, it is a good plan to partly close the throttle for a short period at regular intervals; that the loss of speed during these short periods is more than made up by the higher speed in between made possible by the resulting better lubrication of the sleeves.

In order to ensure a good distribution of the oil over the large surface of the sleeves and the surfaces of the cylinder wall and in the piston, the sleeves generally have numerous oil grooves turned in them, and oil holes are drilled through, often along a helical line, so oil can pass from one side of each sleeve to the opposite side. Between the inlet and exhaust ports, grooves are often cut in an up and down direction to help prevent leakage between these ports.

With pressure lubrication, means are generally provided to increase the supply of lubricant to the upper end of the sleeves under heavy load conditions. These consist in a valve in the oil line which is opened through connection with the throttle linkage as soon as the throttle is opened beyond a certain point. Oil is then delivered directly into the annular space between the cylinder head and cylinder wall above the sleeves.

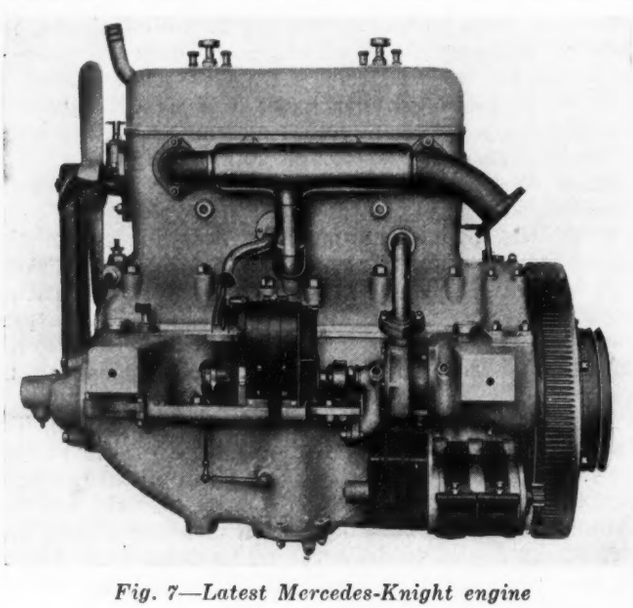


Fig. 7—Latest Mercedes-Knight engine

A point of detail that comes up in the design of sleeve valve engines is the clearance to be allowed between the various concentric parts. If the fit were made too tight there would, of course, be danger of seizing, and the fractional loss would also be increased. On the other hand, if the fit were too loose, piston slap might be expected, especially as there are three clearances in series, all of which must be taken up when the side thrust of the piston reverses in direction.

Practices of the different makers in this respect differ to a certain extent. Some have used as small a clearance as 0.002 in. in an engine of about 4 in. bore. Others use a somewhat larger clearance, pointing out that the seal of the combustion chamber is affected by flexible rings and is not dependent upon the closeness of the fit between the sleeves.

Throughout the power stroke the inner sleeve is near the top of its stroke, and both ports in it are far removed from the combustion chamber and are sealed by the junk ring. It is only during the earlier part of the compression stroke that there is comparatively little lap of the inner and outer sleeves at the inlet port, and this lap is partly opposite the port in the cylinder well. The effectiveness of the seal at this moment has sometimes been questioned. However, at this time the pressure in the combustion chamber is very small, and the very excellent brake mean effective pressures obtained at low speed are proof that there is no appreciable loss of charge at this period of the cycle if the engine is in good condition.

Circulation Through Head Jackets

One thing that distinguishes sleeve valve engines from other types is that the cylinder head extends down into the cylinder a considerable distance. The cylinder head is cast with a water jacket which is open at the top but closed by a cover plate which has water tight joints with the central spark plug well and the top surface of the cylinder casting. Usually there is direct communication between the jacket around the cylinder and the head jacket space, but in one design at least the two parts of the jacket communicate through outside pipes.

The jacket space in the head forms a sort of well, and special provisions must be made to drain the water from it when the cooling system as a whole is drained. Generally a U tube is provided, the two branches of which extend to near the bottom of the jacket space in the head and to a somewhat lower point in the jacket around the cylinder, respectively. If the water is being drained from the engine it will siphon out of the cylinder head jacket space.

The Merecedes firm has developed three types of Knight engines in succession. The first one, which followed the original Knight practice in many respects, having front end chain drive and splash lubrication, was used up to the time of the war. After the war another design was brought out in which gear drive of the eccentric shaft was substituted for the chain drive, and in order to reduce fluctuations in the pitch-line velocity, the eccentric shaft drive was placed at the middle of the engine, which, like, the previous one, had four cylinders. Another change in this model was that the accessories, that is, the pump and magneto, were driven through spur gears directly from the eccentric shaft, instead of by helical right angle gears, as in the original design. Placing the gear for the eccentric shaft between the two middle cylinders necessitated a considerable center distance between these two cylinders, and the cylinders were therefore cast in pairs.

The latest Mercedes-Knight engine, which has been manufactured since 1922, is a four-cylinder block engine and has the upper portion—not the upper half—of the crankcase cast integral with the cylinders. The eccentric shaft in this model is driven by gears with helical teeth located at the flywheel end. Aluminum alloy pistons with cast iron skirts are used. Lubrication is by the usual pressure system, the cylinder and sleeve walls being lubricated by the spray. However, there is an extra oil feed to the space between the cylinder wall and the cylinder head, which is controlled by the throttle valve.

The Daimler Motor Co., of Coventry, the original manufacturer of Knight engines, in its latest models, brought out nearly a year ago, also uses steel sleeves, forced feed lubrication and a supplementary supply of oil to the cylinder head. This firm claims maximum working speeds of 4000 r.p.m. for stock engines.

Various improvements made in sleeve valve engine design by Panhard & Levasser have been pointed out already, particularly the introduction of the lined steel sleeve. One other improvement is to the credit of that firm. In all other Knight engines the inner sleeve at the bottom extends below the outer sleeve, as the lug of the inner sleeve must at all times remain below the outer sleeve. This, of course, makes it necessary to add that much to the over-all height of the engine. Panhard obviates this by cutting a wide slot in the lower end of the outer sleeve into which the lug on the inner sleeve moves. A narrower slot is cut in the inner sleeve, the object of which is evidently to provide clearance for the connecting rod. The elimination of the wide junk ring also has led to a shortening of the sleeves and of the over-all height of the engine.

Single Sleeve Engines

The single sleeve valve engine referred to in the earlier part of the paper was invented by P. Burt, a Scotch engineer. A single sleeve cannot perform the functions of both an inlet and exhaust valve if endowed with merely a simple reciprocating motion, and the Burt sleeve therefore has a combined reciprocating and oscillating motion imparted to it. This may sound complicated, but the valve is in fact quite simple.

Referring to Fig. 8, running parallel to the crankshaft in an upper compartment of the crankcase is a shaft which is driven from the crankshaft by gear or silent chain, but at crankshaft speed, instead of one half that speed as in the conventional engine. This shaft carries helical pinions equal in number to the cylinders of the engine, each pinion meshing with a helical gear of twice its number of teeth, the axis of this gear extending transversely across the engine and intersecting the cylinder axis. The shaft of the gear carries a crank at its inner end, and on the crankpin there is a spherical bearing which is supported in a lug formed on the lower end of the sleeve and is adapted to slide on the crankpin. Any point on the crankpin describes a true circular motion, but the bearing, owing to its connection to the sleeve, also slides in and out, so that the motion of the center point of the spherical seat of the bearing is represented by a circle projected onto a cylinder. However, the sleeve has a smaller radius than the distance from its axis to the center point of the spherical seat of the bearing, and while the bearing and the sleeve in their motion around the cylinder axis describe the same arc, the actual motion of the sleeve is less. For this reason the path of the sleeve as seen from the side is elliptical in shape. The 2:1 reduction is obtained for each sleeve separately by the pinion and gear at the bottom of the sleeve.

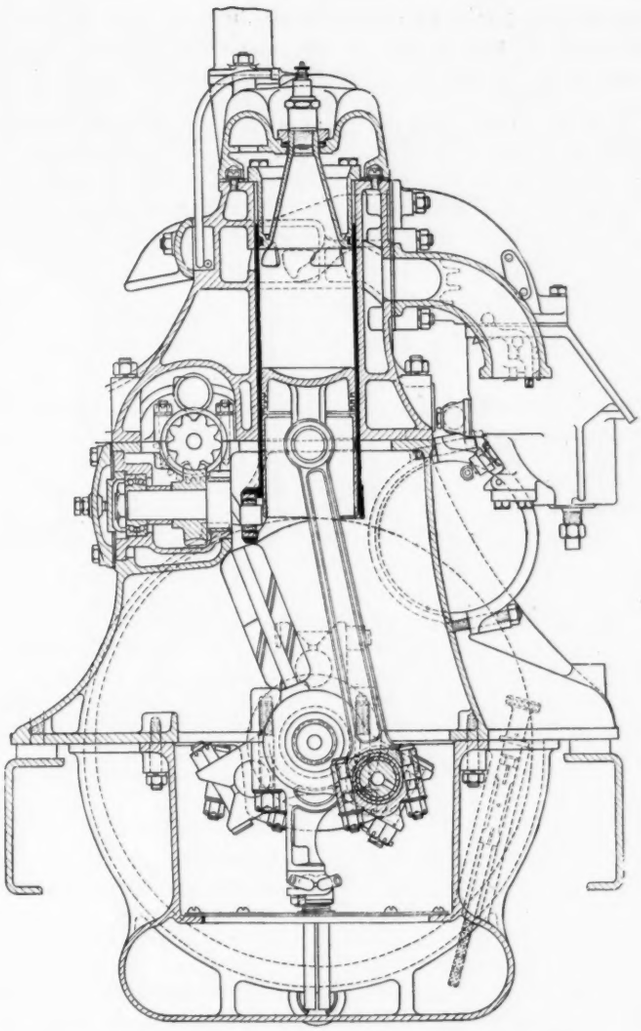


Fig. 8—Cross section of Vauxhall Burt type engine

In the original design of the Burt engine there were three inlet and three exhaust ports in the cylinder wall, and five ports in the sleeve, one of the sleeve ports being of a form different from the others and serving for both inlet and exhaust. In some of the more recent designs this has been reduced to three ports for the inlet and two for the exhaust in the cylinder wall, and four ports in the sleeve, but the general principle of operation remains the same. The outline of the ports also has been changed somewhat.

Form of Ports

The general form of the ports is not unlike that of a right-angled triangle, with the base up in the case of the cylinder wall ports and down in the case of the sleeve ports. In one of the designs of Burt engine the throw of the crankpin is ¾ in., hence the stroke of the sleeve in the cylinder is 1½ in. and its circumferential travel a trifle less. The angular range of motion of the

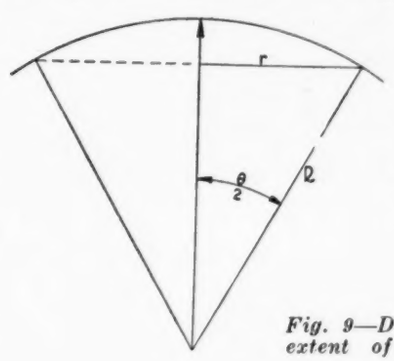


Fig. 9—Diagram for determining extent of oscillating motion of sleeve

sleeve may be readily found from Fig. 9. Let R be the distance of the center of the spherical bearing in the lug on the sleeve from the axis of the sleeve and r the radius of the crankpin operating the sleeve, then, if we call the angle of angular motion O, it is obvious from the diagram that sin O/2 equals r/R. For instance, if r = ¾ in. and R = 2 in., then sin O/2 = 22 deg. and O = 44 deg. The piston diameter of this engine, and hence the bore of the valve sleeve, is 3¼ in., hence

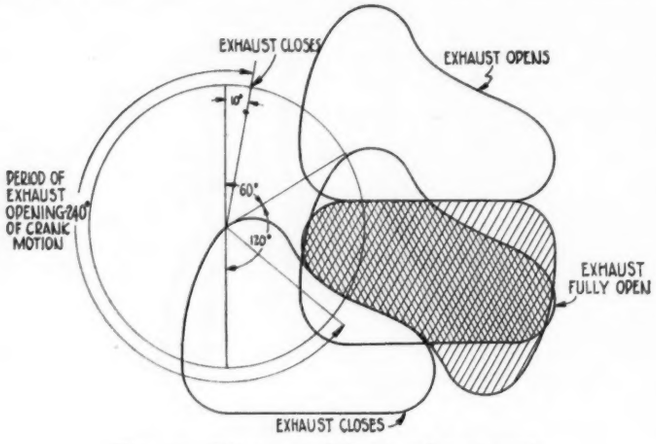


Fig. 10—Diagram of Burt exhaust ports

the circular motion of a point on the inside of the sleeve is

$$1\frac{5}{8} \times 6.28 \times 44/360 = 1\frac{1}{4} \text{ in. (appr.).}$$

as compared with an up-and-down motion of 1½ in.

The valve action can be studied to advantage by considering the ports formed in plane surfaces of which one moves in a circle while the other is stationary. This, of course, involves equal circular and up-and-down motions, and that in reality the circular motion is less than can be compensated for by correspondingly changing the relation between the height and width of the ports.

To make the port action clear I have drawn up diagrams for both the inlet and the exhaust ports. The ports here shown, the valve timing and the angular relation between the engine crankshaft and the valve-operating cranks, are not taken from any particular Bury-type engine, but correspond substantially with the practice of the manufacturers of these engines. In Fig. 10 the total of the cross-hatched area represents the exhaust port in the cylinder wall, while the two unsectioned areas adjacent to it and the similar area midway between them and registering with the cross-sectioned area represent the exhaust port in the sleeve in three different positions. In the highest position of this port it is about to come into registry with the cylinder port; that is, the exhaust period is about to begin. In the intermediate position of the sleeve port it is centrally over the cylinder port, and the exhaust is then approximately fully open. Whether or not this is the maximum opening can be determined only by means of a plani-meter. In its lowest position the sleeve port has just passed out of registry with the cylinder wall port and the exhaust period therefore has come to an end. The motion of the sleeve port from the opening of the closing position, as here shown, represents 120 degrees of travel of the sleeve-operating crank, and therefore 240 degrees of travel of the crankshaft, which is substantially the duration of the exhaust period in any high speed engine. Now, we can, of course, vary the angular relation of the sleeve-operating crank to the crankshaft and thereby vary the timing. Usually the exhaust valve closes slightly after the crankshaft has passed the top dead center, and we may assume that it is desired that it shall close 10 degrees of crank motion after dead center. In the diagram the sleeve-operating crank is shown to be in the bottom dead center position when the exhaust port closes, and this position of the sleeve operating crank must then correspond to a position of the crankshaft 10 degrees past the top dead center, as indicated in the diagram.

Attention may here be called to the rapid opening of the exhaust port. It will be noticed that the port in the sleeve moves with substantially its full width across the port in the cylinder wall, and since the sleeve-operating crank is approaching the 90 degree point, the motion is nearly straight down and therefore at nearly maximum speed. For this very reason it should not be necessary to give the exhaust a very large lead.

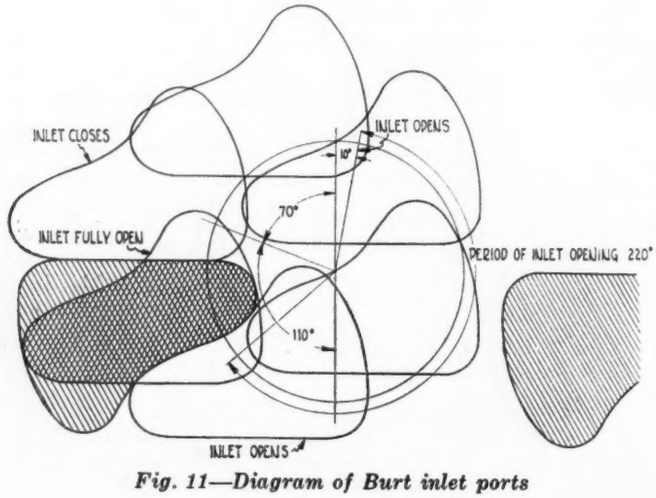


Fig. 11—Diagram of Burt inlet ports

Inlet Ports

A similar diagram of the inlet port action is shown in Fig. 11. The cross-sectioned area again represents the port in the cylinder wall, while the other similar areas represent the port in the sleeve in different positions. When the sleeve port is in the lowermost position it comes into registry with the cylinder wall port, and the inlet period begins. Since the sleeve operating crank is then in the lower dead center position, this occurs when the crankshaft has passed the top dead center position by 10 degrees. The inlet period usually is somewhat shorter than the exhaust period, and the inlet ports therefore are made of somewhat smaller vertical height than the exhaust ports. In the diagram the inlet period is 110 degrees of sleeve-operating crank motion and 220 degrees of crankshaft motion, and since the inlet begins to open 10 degrees after top dead center, it closes (220 + 10) — 180 = 50 degrees past bottom dead center.

The same as the exhaust port opens very rapidly, so the inlet port closes very rapidly; in other words, the inlet ports remain open comparatively wide until late in the inlet period, which should give a high volumetric efficiency.

In this diagram the position of one of the inlet ports in the sleeve is shown at a number of nearly equal angular intervals throughout the cycle. The inlet is open during substantially the first half of the upward motion of the sleeve, while during the remaining half of the upward motion and during the whole of the downward motion the sleeve port is out of registry with the cylinder wall port. From the path followed by the sleeve port the spacing of adjacent cylinder ports can be determined, for during the last half of its downward motion the sleeve port must pass between adjacent cylinder wall ports without coming into registry with either one of

them. A certain minimum margin between the sleeve port and the adjacent cylinder wall ports is undoubtedly required, because the sleeve port approaches most closely to the cylinder wall ports during the early part of the exhaust stroke, and if the seal of the inlet ports were poor at this time, some of the exhaust gas might get into the inlet passage and dilute the charge for the next cycle. Just how much this margin should be is obviously one of the fine points of single sleeve valve design. By making this margin smaller the total port opening area can be increased.

Double Port in Sleeve

One of the ports in the sleeves is a double port, which registers with an exhaust port in the cylinder wall during the downward motion of the sleeve and with the inlet port in the cylinder wall during the upward motion. The arrangement is somewhat as shown in Fig. 12. The double port is of considerably greater width than the ports in the cylinder wall, and as it passes out of registry with the exhaust port it passes into registry with the inlet port. That portion of the double port which comes into registry with the exhaust port only is of somewhat greater depth than the rest, as required by the greater angular duration of the exhaust period.

To the right of the double port in the diagram are located the two or three exhaust ports, and to the left the three or four inlet ports. The backs or high sides of the farthest inlet and exhaust ports in the cylinder wall can come quite close together, because the ports in the sleeve do not travel materially beyond these lines.

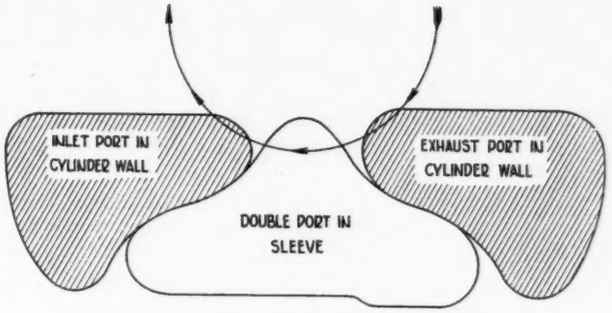


Fig. 12—Double port in oscillating sleeve

One of the latest Burt type engines to be brought out abroad is a six-cylinder Vauxhall engine of 81.5 by 124mm. (nearly 3¼ x 5 in.). In order to balance the end thrust on the sleeve-operating shaft, three of the helical gears on it are cut with right-hand and the other three with left-hand helical teeth. The sleeve-operating shaft is driven from the crankshaft through a toothed chain, and the timing of the layshaft can be accurately effected by means of a vernier arrangement.

There are ten main bearings on the crankshaft, which is due to the fact that the front, middle and rear bear-

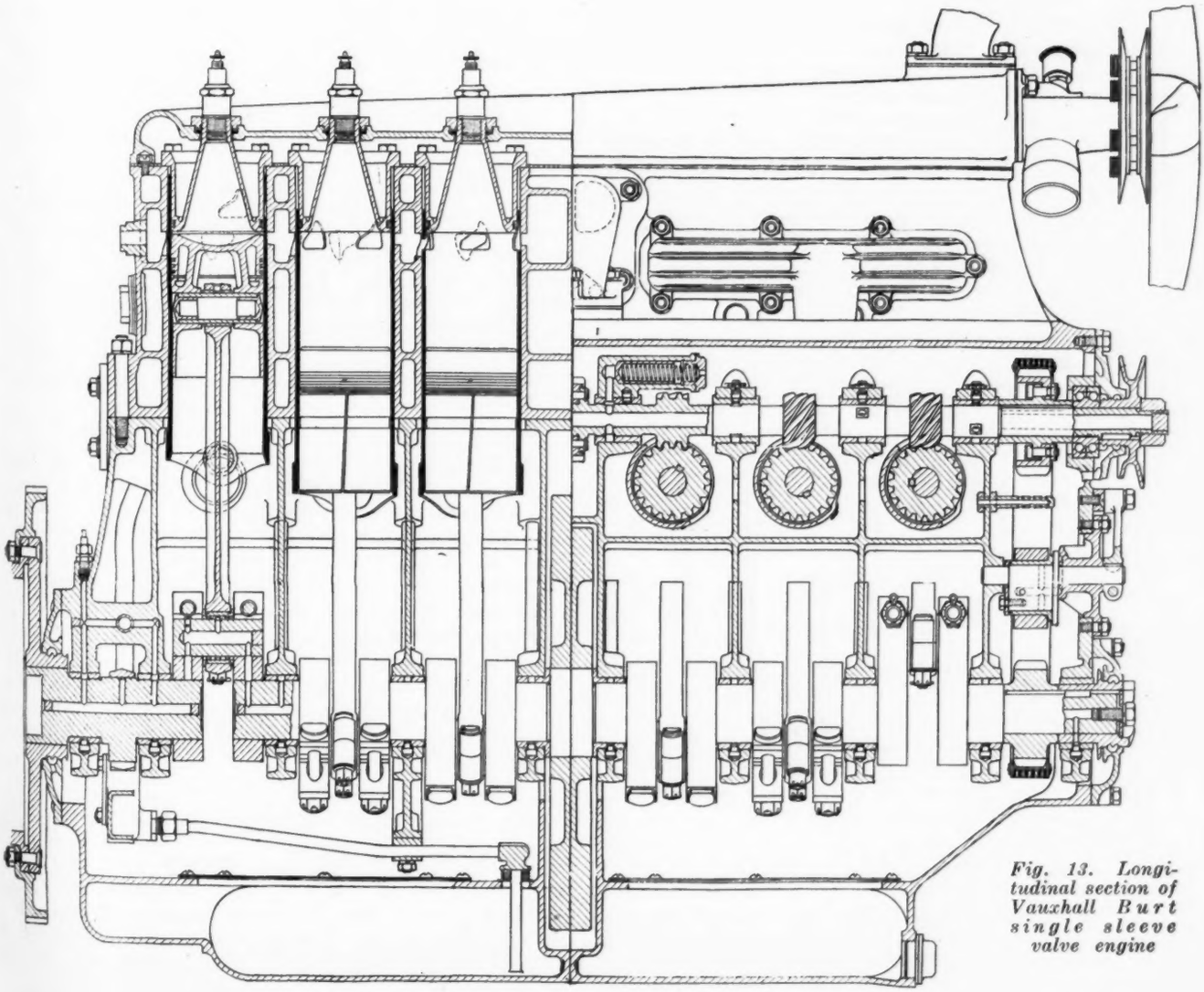


Fig. 13. Longitudinal section of Vauxhall Burt single sleeve valve engine

ings are each split in two, the sprocket wheel for the timing shaft drive chain being located between the halves of the front bearing; what looks like a fly-wheel but serves as an oil thrower for the toothed chain drive for the magneto and generator is located between the halves of the middle bearing, and an eccentric for the oil pump drive is mounted between the halves of the rear bearing.

The crankshaft is of rather unusual construction, being built up of units which are clamped together. The crank arms are pressed over the main journal portions, and the arms are split and V-notched at their outer ends and have the separate, hardened crankpins pressed into them and held firmly in them by pinch bolts.

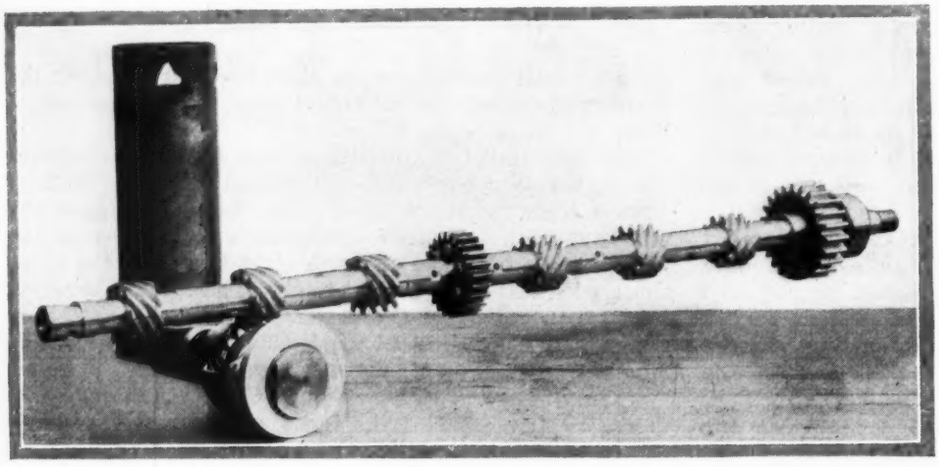


Fig. 14—Sleeve operating shaft of Vauxhall engine

Floating bronze bushings are fitted between the connecting rod heads and the hardened steel crankpins, and are provided with numerous oil holes. The advantage claimed for this construction is that it permits narrower crankpin bearings to be used than would otherwise be the case, which in turn reduces the centrifugal forces. The connecting rods are duralumin forgings, of the conventional section, and the pistons are of aluminum alloy, of a design quite popular in England, in which the skirt and the piston bosses are supported by an arch-shaped structure, which is claimed to spread the skirt and thus prevent piston slap.

The single valve sleeve is of cast iron. There are five ports in the cylinder wall, of which three serve for the inlet and two for exhaust. In the valve sleeve there are four ports, of which one is a duplex port.

The combustion chamber is of the general form of a frustrated cone. It will be observed from the sectional view that it is well jacketed, and as the form of the piston also suggests the possibility of a rapid transfer of heat to the cylinder jacket it is understandable that an unusually high compression can be carried. The volumetric compression ratio is 5, which is probably higher than has been carried before in a passenger car engine.

The cylinder head extends down into the cylinder and forms an annular space into which the upper end of the valve sleeve extends, the same as with the double sleeve valve engine. Owing to the fact that the ports are comparatively narrow in the circumferential direction, no wide ring is required. In fact, only a single ring of normal width is used.

As regards the balance of a single sleeve valve engine, what was said in connection with the double sleeve valve engine applies in this case also. That is, in a four-cylinder engine the primary unbalanced forces on the sleeves will not be neutralized, while the secondary forces will be neutralized. Of course, with two sleeves, of which one leads the other by, say, 70 degrees, the total unbalanced force on the sleeve is greater (by about 64 per cent) than on a single sleeve of the same weight as each of the two.

In the single sleeve valve engine we have an oscillating motion of the sleeves in addition to the reciprocating motions, but these oscillating motions are at least very nearly balanced.

No comparison of the merits of the different types of engine will be attempted in this paper. In judging these merits one would have to take account of at least six factors, namely, cost of manufacture, weight efficiency, fuel efficiency, reliability, life, and freedom from noise in operation. It is hardly conceivable that any one type could excel in respect to all of these, and, moreover, since it is practically impossible to weight superiority in one of these items against superiority in another, any conclusion based solely on theoretical considerations would be of no value.

The same as competition is the life of trade, so it is a stimulant to technical progress. It is very doubtful whether poppet valve engines would be as silent in operation as they are today if it had not been for the advent of the Knight engine.; at any rate progress in silencing that type of engine would not have been nearly as rapid. The introduction of the single sleeve valve engine on the American market may introduce another element of competition which will stimulate further development in the older types.

A NEW edition of a pamphlet on Shore's Standard Scleroscope; Its Application to the Arts, has been issued by the Shore Instrument & Mfg. Co., Van Wyck Ave. and Carll Street, Jamaica, N. Y. This pamphlet contains a great deal of useful information, the scope covered by it being made evident by the following chapter heads: The Scleroscope; Purchasing Raw and Finished Material to Scleroscope Specifications; Carbon Tool Steels; High Speed Steel Hardness and Cutting; The Relation of Hardness to Other Physical Properties; Alloy Steels; Hardness Standards Adopted by Automotive Engineers; Cementation and Case-hardening Springs; Description and Operation of Scleroscope Model C-1.

Truck Registrations

ON page 260 of the February 18, 1926, issue of *Automotive Industries* truck registration figures for Florida and District of Columbia were transposed through a typographical error. Trucks registered in District of Columbia were 13,422 while in Florida there were 50,038.

Just Among Ourselves

What Do Codes of Business Ethics Mean?

BUSINESS codes of ethics have become quite common in recent years. Business associations large and small have adopted officially some sort of written principles upon which the various members pledge themselves to conduct their activities. As visualizing concretely given ideals, these codes serve an excellent purpose. They set up a mark at which to shoot. But one trouble with a good many of them is that they are so general and their terminology is so vague as to give enough leeway to the individual conscience to permit almost any kind of action. In one automotive code we saw the other day, for example, the members of an association pledge themselves to raise the level of the industry by "being ethical, inspiring confidence, playing clean, etc." What seems ethical to one man may seem like highway robbery to another; what is one man's spree is another man's moral turpitude; cleanliness, like godliness, is relative. When every man is his own judge, the quality of justice is in direct proportion to the social or anti-social character of the individual's concepts. And yet, in the development of individual ability to accept responsibility for individual action lies the way to permanent progress. So the codes of ethics, while they might well be couched in better defined terms, are a step in the right direction.

* * *

Ford Price Trends Show Competitive Development

DISCUSSING the recent Ford price changes, a Ford publicity story points out the interesting fact that since March, 1920, the Ford company has reduced prices an average of well over 40 per cent. The touring car today, is $265 less than in 1920, the runabout $260 less, the two-door sedan $455 less, and the coupe $350 less. It is interesting also to compare the new prices with those of March three years ago. Prices today as compared with March, 1923, show that the touring car now is $12 higher, the runabout $21 higher, the two-door sedan $75 less, and the coupe $30 less. The respective percentage changes are 4.1% up; 7.8% up; 12.6% down; and 5.15% down. This would seem to indicate that, as might be expected, the possibility of gaining sales advantages solely through price adjustments becomes increasingly difficult as time goes on.

* * *

Differential Against Used Cars Increases

USED cars always were harder to sell than new cars, but in recent months added difficulties have come in the disposal of the used vehicles. Liberal financing terms of new vehicles and new low rates on new vehicle installment sales both have increased the differential against the used car. Reduction in rates or extension of terms on used cars would not solve the problem, in the opinion of most people familiar with the situation, because the losses resulting from such action would mount very, very rapidly. This changed condition means that a stock of used cars today of the same number as three years ago constitutes a less flexible investment. Under present conditions, demand pressure being equal, greater sales effort probably is necessary today to move a given number of used cars. These facts are important in any consideration of the question of dealer stocks.

* * *

A Heavy-Oil Engine For Airplane Service

GOOD deal of interest has been evidenced lately in engineering developments along heavy-oil engine lines. It is rumored that one important firm now is experimenting with an air-cooled airplane engine of this type, burning crude oil as fuel. The experimental job is said to be of the eight-cylinder radial type with the cylinders arranged in pairs, one behind the other, with a common head for each pair. This engine is said to develop 200 hp.

* * *

Telephones and Motor Vehicles Grow Together

GRADUALLY the automobile is outstripping the telephone in number of units in use. There are more automobiles in the country today than there are telephones, although telephones maintained a lead up until a year or two ago. Newest report of the Bell Telephone Co. of Pennsylvania makes possible a specific comparison as regards that State. Back in 1920, in Pennsylvania telephones connected with the Bell system led the motor vehicles by a score of about 715,000 to 570,164. On December 31, 1925, however, the score stood Motor Vehicles—1,317,053, Telephones—1,123,851. Motor vehicle registrations increased 88,467 or 7.2 per cent in Pennsylvania last year over 1924; telephones in use increased 44,444 over 1924 or about 4.1 per cent. Since the telephone got under way several years before the automobile industry it is natural to expect that the period of rapid growth of the latter should extend a few years beyond that of the former.

* * *

Factory Production and Production of Sales

A PROMINENT engineer has the idea that working on a sales prospect is just as hard as working on a part in the shop. "Have to do just as much work in chipping off obstructive ideas from the mind of the prospective buyer as you do in taking metal off of the rough casting in the factory." The simile might be carried further, of course, if ivory castings were used in automotive production, but even though they aren't the train of thought started may lead somewhere.—N. G. S.

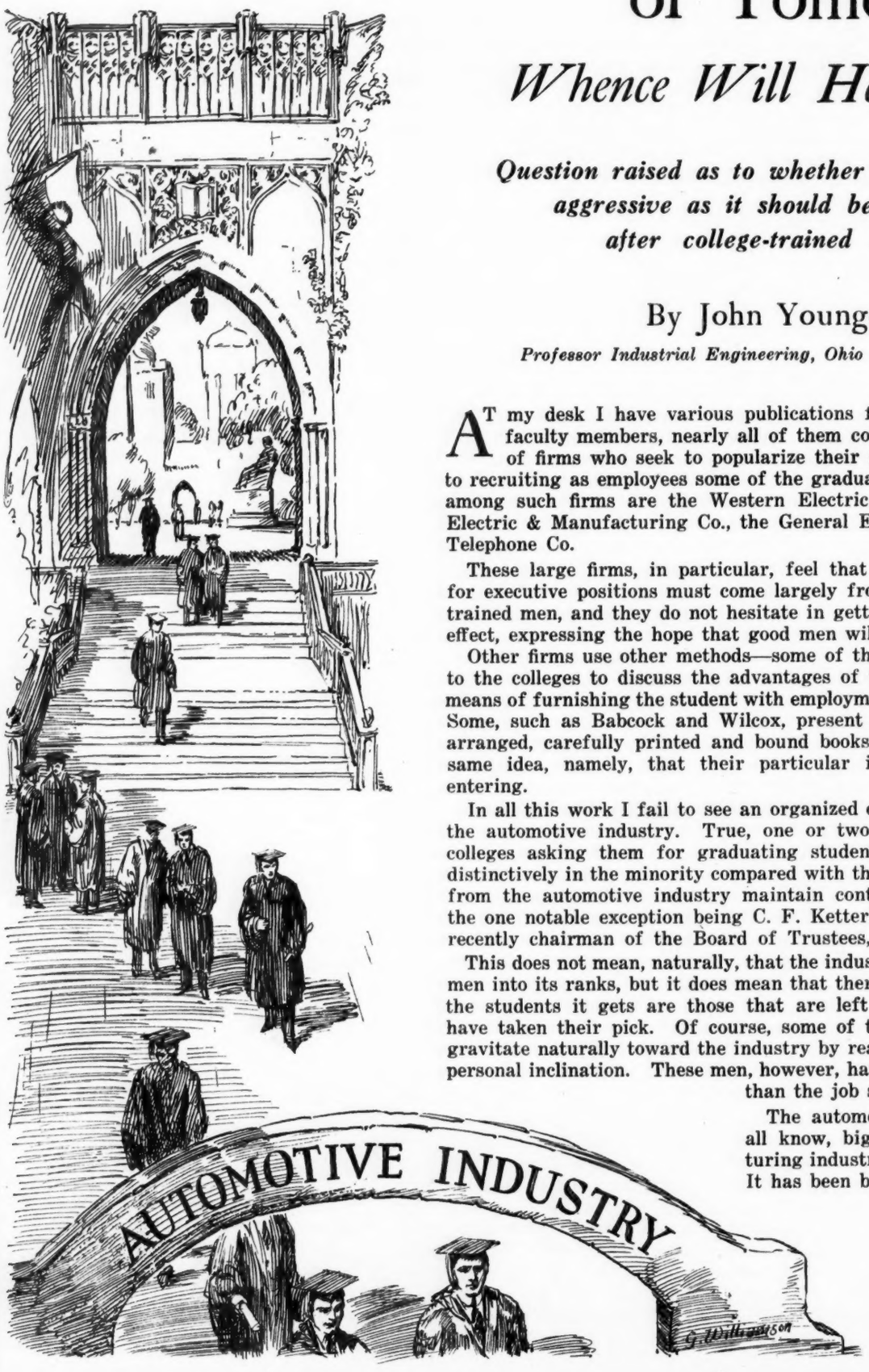
The Automotive Executive of Tomorrow—

Whence Will He Come?

Question raised as to whether industry is as aggressive as it should be in going after college-trained men.

By John Younger

Professor Industrial Engineering, Ohio State University



AT my desk I have various publications for college students and faculty members, nearly all of them containing advertisements of firms who seek to popularize their advantages with a view to recruiting as employees some of the graduating students. Notable among such firms are the Western Electric Co., the Westinghouse Electric & Manufacturing Co., the General Electric Co. and the Bell Telephone Co.

These large firms, in particular, feel that their future employees for executive positions must come largely from the ranks of college-trained men, and they do not hesitate in getting out publicity to this effect, expressing the hope that good men will join them.

Other firms use other methods—some of them send representatives to the colleges to discuss the advantages of their particular shop as means of furnishing the student with employment after leaving college. Some, such as Babcock and Wilcox, present the students with well-arranged, carefully printed and bound books all tending toward the same idea, namely, that their particular industry is well worth entering.

In all this work I fail to see an organized campaign on the part of the automotive industry. True, one or two firms do approach the colleges asking them for graduating students, but these firms are distinctively in the minority compared with the others. Very few men from the automotive industry maintain contact with their colleges, the one notable exception being C. F. Kettering, who was until very recently chairman of the Board of Trustees, Ohio State University.

This does not mean, naturally, that the industry is not taking college men into its ranks, but it does mean that there is the probability that the students it gets are those that are left over after other firms have taken their pick. Of course, some of these good students will gravitate naturally toward the industry by reason of their own strong personal inclination. These men, however, have to seek the job rather than the job seeking them.

The automotive industry is, as we all know, big—the biggest manufacturing industry in the country in fact. It has been built up largely of young men and there is a feeling in my mind that these men are not taking thought for the future and are not thinking of the possibility that some day they will have to be

displaced and other men begin to fill their shoes. There is a constant exodus of older men from the industry; these should be replaced with a steady influx of new men.

The question we face is what kind of new men are we bringing in? Are we not perhaps bringing in our men haphazardly, without any planned idea as to what we are going to do with them when we have them and what we are going to develop them into? Should we not exercise some care to see that at least some of these men represent the best young men that are available? Should we not go out to these young men and do a little publicity work in telling them that the automotive industry is one well worth entering; that its possibilities are greater; its rewards higher? Many a good young student whose mind is not fully made up would be tempted to follow the thought in this publicity and to act on it and the industry would be the gainer by this man.

The true value of the automotive industry, or indeed any industry, is measured by its man-power and we must have good men to succeed the present leaders.

"THE true value of the automotive industry, or indeed any industry, is measured by its man-power and we must have good men to succeed the present leaders," says Prof. Younger.

Around this thought he has written an article which is an appeal to the automotive industry to give more attention to the recruiting of high-class college-trained men who can be developed into capable executives.

Other industries have been very aggressive in this direction in recent years, but the automotive industry, Prof. Younger says, has lagged with the result that the other industries have been getting the pick of the men. He urges advertising as one means of developing the necessary degree of interest among students.

This fact is recognized, as stated, not only by some of the large engineering industrial corporations outside of the automotive industry, but is also recognized by some of the engineering societies other than the Society of Automotive Engineers. The American Society of Mechanical Engineers, for example, takes a very active interest in educational and apprenticeship methods.

In discussion with Prof. W. T. Magruder, vice-president of the A.S.M.E., he tells me that his Society is very strongly interested in the development of future leaders of industry and he gave me a list of numerous firms, too numerous to mention, who keep in close contact with this educational work and with the graduating students so their ranks can be refilled as occasion demands. Similarly in the electrical industry and in the chemical industry, but the automotive industry is lagging.

This is a strong plea for the automotive industry through its National Chamber of Commerce, through the Society of Automotive Engineers, and through the firms themselves, to become interested in educational problems. Automotive organizations should find out how students are being trained so they will be fitted for their work; they should discuss education with the various colleges and universities with the idea of giving constructive criticism of benefit for the furtherance of this aim. Colleges would be glad to listen. They should come in contact with the graduating students. Leading men of the industry should visit the universities and colleges frequently. Students would benefit by contact with these men and think better of the industry they represent.

There is another way in which this subject should be viewed. It occurs to me that possibly by this very intimate contact between the educational institutions on one hand and such firms as the General Electric on the other that there has arisen in our universities a preponderance of teaching of power problems. This means that automotive engineering is a subject, which, while perhaps not being neglected, does not carry the same weight as it would if the automotive industry itself took a direct interest in the work. This reason alone should be sufficient to encourage automotive people to get into intimate contact with our educators.

It does not seem to me that our biggest industry should be so poorly represented in our universities, and finally it does not seem right to me that our biggest industry should be so apathetic toward the development of its future executives.

OF considerable interest to executives of businesses which require the services of technically trained men are a series of reports on "Investigation of Engineering Education," recently published by the Society for the Promotion of Engineering Education.

The conclusions reached by the Committee, which made a study of engineering graduates and students, were:

1. That better methods of vocational guidance should be developed. 2. That the possibility of engineering school supervision of the studies of graduates in industry should be considered. 3. That there is need for more thorough training in economic subjects as a part of engineering curricula. 4. That consideration should be given to scholastic difficulties with the purpose of decreasing the present large number of eliminations from technical schools.

One important point brought out was the very high turnover of graduates—57 per cent of the graduates of 1922 having held two or more positions since graduation and 25 per cent of these have held three or more. It was this condition, indicating an unwise choice of first positions in too many cases, that induced the Committee to recommend better vocational guidance facilities.

Other industries advertise extensively for college-trained men and the suggestion is made in the article above that the automotive industry might also use this method to advantage. Such advertising makes its most direct appeal in college magazines and year books.

Radiator Standardization Urged to Facilitate Production

Need for standards evidenced by wide range of radiator types, of production methods and of operating conditions. Rich, low brass given as best material.

RADIATORS may be classified either according to the type of core used or according to the type of shell or frame and tanks and the method of their connection with the core. Complete radiators are divided into five classes of which four are what might be called regular production articles while the fifth is used only for so-called custom built cars or wherever the number required is too small to warrant the installation by special equipment, but a light radiator must be provided.

In a paper presented before the Milwaukee Section of the Society of Automotive Engineers by F. M. Young, vice president of the Racine Radiator Company, the characteristics of each type of radiator was outlined, those affecting cooling efficiency as well as those relating to ease of production and the field of application of each type.

Some information was also given regarding the materials used for both cores and tanks and the viewpoints from which the relative merits of these materials must be judged. In concluding his paper Mr. Young made a strong plea for further standardization and for wider use of the standards already adopted which would enable radiator manufacturers to simplify their requirements and get on a much better production basis.

Various Types Discussed

In the first part of the paper the various types of cores are discussed together with their adaptability to different uses in the automotive field. Weight efficiency, appearance and economy of manufacture are determining factors in the passenger car field while strength or the ability to withstand vibration and rough handling is an important characteristic in the commercial vehicle and industrial fields.

In March, 1923, the radiator Division of the S. A. E. Standards Committee set up a classification of core constructions embracing four types, as follows: Individual fin and tube core; continuous fin and tube core; ribbon cellular core, and air tube cellular core.

The first mentioned type, that is, the individual fin and tube core, sometimes has a continuous helical fin, while at other times it has individual fins or washers of copper or brass which are pressed over the tube and then soldered in place. The helical fin also is soldered to the tube and the soldering generally is effected by machine at the same time the fin is applied to the tube. Generally the tubes are round, but occasionally oval tubes are used, in which case, however, it is necessary to use the individual fins.

The tubes are assembled in the header plates to which the tanks are soldered or bolted; they extend through pressed back sections of the header sheets to which they are soldered. For this type of core a cast frame is to be preferred, as it affords the necessary rigidity and relieves the tubes and their soldered joints with the header plates of strains. This type of radiator is now largely confined to the larger trucks, where the restrictions on weight and bulk are not particularly severe. It was used with great success on the Class B military truck, one of its advantages being that no great amount of special machinery is required for its production.

The continuous fin and tube type, mentioned second, is widely used and possesses the advantages that lapped joints can be done away with and that it is easy to manufacture. No intricate machinery is needed and unskilled labor can be used in its manufacture. The horizontal fins are soldered to the vertical tubes, and there are two possible methods of making this soldered joint. The first, which is now practically obsolete, consists in immersing the whole core in a bath of solder, while the second, more commercial one, consists in heating the core assembly in a furnace to such a temperature that the solder on the tubes melts and forms a joint with the fin sheets. It is very important that the tubes be a close fit in the fins and that a good soldered joint be secured, as upon the perfection of this joint depends the heat conductivity of the core.

With this type of core, too, the tubes at top and bottom extend through header sheets, to which they are soldered, and in order to protect these soldered joints from injury it is very important that the core be surrounded by a rigid casing which will relieve it of all diagonal strains. Some manufacturers place all of the tubes in line, while others stagger them.

In the ribbon cellular type of core the water space is usually formed by two sheets with expanded edges, which are soldered together at front and rear over a width of ¼ to 5/16 in., usually by dipping. Two types of spacer are used, one serving principally to baffle the air passing through the core, the other to help radiate the heat by being brought into metallic contact with the walls of the water channel over the greater part of the core depth. This contact is produced by dipping the front and rear of the core and drawing the solder up by capillary attraction. An intimate joint between the water channel walls and the spacer greatly increases the heat dissipating capacity per unit of metal contained.

Must Not Overstrain Metal

In the manufacture of radiators of this type care must be used not to overstrain the metal, as by drawing it too severely in forming the water channels. In service the water channel expands and contracts, and if the material in its walls has been overstrained in the manufacturing processes, it is apt to crack. Sharp turns in the water channels should be avoided, as they tend to cause clogging, and straight and direct air passages are also desirable, as such cores will not collect and hold dust, dirt and oil to the same extent, and can also be more readily kept clean.

Radiators of cellular appearance also are made of flat corrugated tubes with mechanically seamed joint tubes.

This type of water channel makes for a greater useful depth of core and fewer and stronger joints, and, therefore, gives increased rigidity. With this type of core a rather high degree of cooling efficiency is obtained, partly owing to the continual breaking up of the water film in its downward course through the core. The water, moreover, is thrown from one side of the channel to the other, causing a washing action, enabling it to abstract more heat from the walls. Manufacturing methods have been developed making it possible to manufacture this type very economically.

Used on High Grade Cars

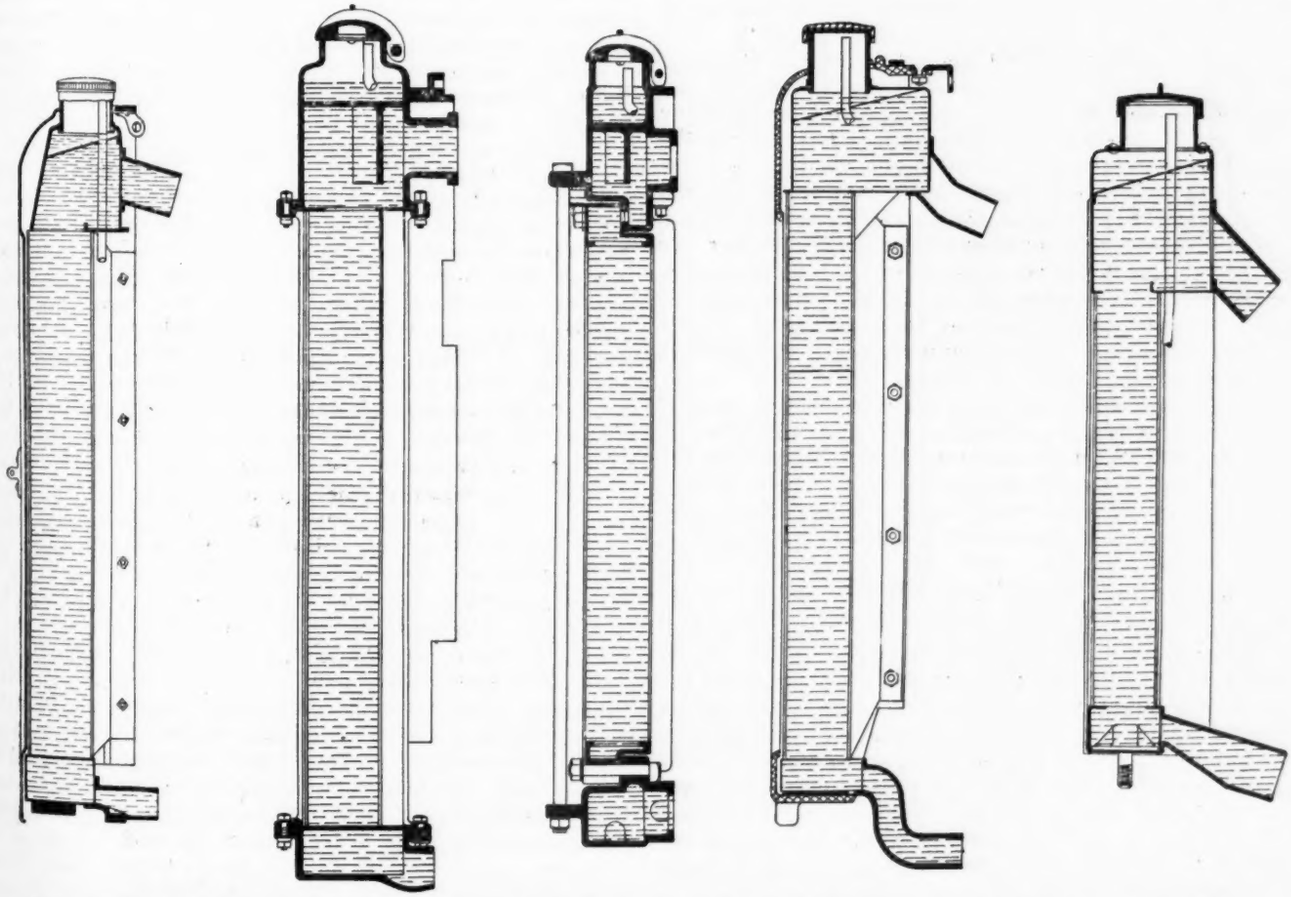
The air tube cellular type of core was originally made of drawn tubes of square section, and much used on high grade cars. The best known present representative of this type is the copper extruded tube with round center section and expanded hexagonal ends. An assembled core of this type is a very rigid structure and it provides both vertical and horizontal water passages. As now manufactured, the tubes are made with impressions giving a turbulent action to the air and causing a slight washing of the walls, thereby increasing the core efficiency. This type of core probably would be used more if it were possible to manufacture it more economically than is the case at present.

Conditions of service determine which of the different available cores is the most suitable in any case. In the industrial field a type of core is desirable, which, while lacking the flexibility of the lighter types, has greater inherent strength and is not entirely dependent upon the frame work built around it. Moreover, some core constructions are injured by slight freeze-ups that will do no damage to the engine. For the rougher class of service above referred to, a type of radiator is best adopted which, upon being assembled and soldered, becomes practically an integral mass which cannot be broken down or rendered leaky by vibration, which is practically immune from damage by freezing and which can be rapidly assembled because no header sheets are required, the tanks being fitted directly to the top and bottom.

Brass, bronze and copper are used for the consturction of cores. Steel and iron inserts are sometimes employed, but this is not considered good practice. Brass is not as good a material for this purpose as the others mentioned, because of its porosity, and its period of usefulness in a radiator is usually limited to 6-12 months, depending upon the water used in the cooling system. The brass used is composed of 65 per cent copper and 35 per cent zinc, and, since it is less ductile than the other materials it cannot be worked as much and ruptures more easily. Greater care must be exercised in solder-dipping a brass core, as the heat of the solder bath has a tendency to "dezincify" the alloy, and to disintegrate the structure.

In districts where the water contains lime and alkali, the life of radiators of this material is further reduced. The material is extensively used, however, and in ordinary service, if care has been taken in the manufacture, it is quite satisfactory. The thickness of the stock varies from 0.0025 in. where the core is completely dipped in solder

Five Types of Complete Radiators



LEFT TO RIGHT: *Pressed shell passenger car radiator; cast tank removable core type radiator; cast tank sectional core type radiator; cast shell detachable core and tank radiator; sheet metal type radiator*

to 0.005 and 0.006 in. where only the edges are soldered. This material is extensively used for both the tubes and fins of tubular radiators. The tubes, however, are usually completely covered with solder both inside and out, and this enhances its usefulness for this purpose, as compared with cellular cores, especially when cost is considered.

Copper is largely used for the fins of tubular cores, chiefly on account of its high heat conductivity and heat dispersing power. It is little used for cellular cores. One reason is that with copper these compact structures become heavier, and another that impurities found in the water in certain localities set up an electrolytic action with the copper—unless the surface of the latter is tinned—which attacks the copper and causes leaks. Copper is very ductile but has less tensile strength than either of the other materials mentioned.

Bronze or Brass Best Material

Bronze or rich low brass is considered the better radiator material. It consists of approximately 85 per cent copper and 15 per cent zinc and combines the ductility of copper with the rigidity of zinc. It is possible to furnish this material more free from porous spots than either of the others, and it is also more enduring in districts where the water contains lime or alkali. Several years ago a car manufacturer circularized radiator manufacturers as to what in their opinion was the best material for radiator cores, and the consensus of opinion was that rich low brass is by far the most enduring.

Solder for cores usually ranges in composition from 40 per cent tin and 60 per cent lead to 50 per cent of both. The latter, which is the more expensive, tin selling at about 54 cents per pound as compared with 7 cents for lead—gives the stronger joint, but where it is desired that the solder shall not run or flow so readily, the percentage of lead is increased.

In the manufacturing process great care is exercised to keep the amount of solder used per core constant, for with stock of only about 0.005 in. thickness, the addition of only one thousandth of an inch means a large loss to the manufacturer in quantity production. To this end the solder must be kept at a uniform temperature and the material must be inspected for thickness. All material under a specified weight must be rejected, the dies for forming the core parts must be held to a high degree of accuracy so that no sharp edges may be formed, and the relation between the punch and die must be accurately maintained, whether the water channels are expanded by an up and down motion or by rolling.

After the acid and solder bath the core must be washed and flushed, to remove all traces of acid which would attack it. This is particularly necessary because of the fact that there is usually an interval of from two to four weeks between the time the radiator leaves the manufacturer's plant and the time it is placed in service.

Cores Vary in Depth

Radiator manufacturers usually make cores in several depths, by varying the width of the ribbon in the case of cellulars, the number of tubes in depth in tubulars and the length of the tube elements in the case of air tube cellulars.

The efficiency of a radiator is sometimes expressed in heat units dissipated per unit of time per pound of core material used. This is an unfair method of rating, however, in classes of work where great strength is required and heavier stock therefore must be used. Also, in applications where dust and dirt will accumulate on the radiator a comparatively free air passage is required rather than one designed to give the maximum heat dissipating capacity under ideal conditions.

Complete radiators may be divided into three classes, as follows:

A—Pressed shell with removable core and tank assembly.

B—Cast tank type radiators, one piece removable type or sectional core.

C—Sheet metal tank type, integrally constructed radiator.

Type A is used almost exclusively on passenger cars, light trucks and taxicabs. The shell is drawn from 3 to 5 in. in depth, with an extension of 1 in. for supporting the hood. As a rule, steel is used for the shell, although of late duralumin and other alloys have been adapted for the purpose, which dispense with the necessity of nickel plating. The weight of the material used ranges from 22 to 18 gage, depending upon the depth and details of form, and upon the strength required. This type is also used with excellent results in the light and medium weight truck field, up to 2½ tons, the gage of the steel then ranging from 20 to 16. For industrial power units both heavy drawn (16 and 14 gage) and cast shells are used.

In recent years much importance has been attached to methods of mounting the radiator on the machine; of course, with the increase in rigidity of frames the difficulty of this problem has been lessened in a degree. At one time flat brackets or trunnions were used to mount radiators on flexible frames, or they were mounted by screwing studs or cap screws into castings forming part of the lower tank of the radiator. Both of these methods proved defective.

The present greatly improved method consists in building a radiator core and tank assembly independent of all vertical or horizontal chassis bracing and suspending it in the shell structure, usually by pressed steel side pieces which are soldered to the side of radiator extensions running several inches over the tank ends and giving a complete support to this unit, thus eliminating the possibility of direct strains on any part of the core and tank assembly.

Shell Takes the Strain

The casing or shell becomes the strain or shock insulator. It is usually fitted with a section of band iron extending across its bottom and partly up its sides, to be riveted either to the sides of the shell, or, through them, to brackets on the outside which support the whole assembly. Where brackets or trunnions are not used, studs are usually riveted into the heavy band to which the radiator is secured. A shock insulator of woven material, ⅛ or 3/16 in. in thickness, is placed between the lower tank and this supporting member. Bus radiators with polished cast aluminum shell also follow this same general construction.

Cast tank type radiators are extensively used on heavy trucks and industrial power plants. Generally four castings are employed, viz., top tank, bottom tank and two side members. A core, either square or rectangular in shape, is fitted with header sheets which are bolted between the upper and lower tanks and the side members at the ends, and bolted against the top and bottom tanks both in front and rear with clamping strips. This construction has been much used in the past on heavy trucks fitted with solid tires, but it is possible that with the increasing use of pneumatics and weight limitations being placed on trucks and loads by state legislation, truck radiators will be lightened either by the use of stampings, which are usually employed where the production is large enough to warrant the expense of the dies, or by substituting aluminum for iron castings. This type of radiator is free from the joint and tank weaknesses of the sheet metal tank type of radiator, and certain core constructions demand

the secure bracing which the rigid cast tank provides.

These radiators may be mounted either on the frame side members by means of brackets or trunnions, by means of studs or cap screws on the bottom tank, or by bracket extensions cast on the tanks.

Radiators with integral sheet metal tanks are rarely used on passenger cars, only on a few so-called custom-built machines, in which case they are really hand made and the material of the casing and assembling parts in brass or nickel silver instead of steel. They are widely used for smaller power units in the industrial field. The material is usually a rust-resisting steel alloy of heavy gage, or coated or tinned sheet steel. By the use of dies for forming the tanks, side members and re-inforcements, a very economical construction is obtained. In fact, low cost of construction is the chief merit of this type; it is not equal in appearance to the pressed steel shell type, nor in the impression of ruggedness to the cast tank type.

Calculating Fan Size

The fan should preferably be of a diameter equal to the height and width of the core, and where this is impracticable, as in the case of large trucks and industrial power plants, a properly designed fan housing is advisable. In passenger cars the air speed through the radiator induced by the motion of the vehicle is usually greater than that obtained by the fan in a stationary unit, hence in the latter type of unit an efficient fan and an adequate drive must be used. The size of the radiator also should be liberal rather than scanty, to take care of the reduced cooling capacity at high altitudes and in hot climates, and of the increase in the heat delivered to the radiator in mountainous districts and after the engine has become worn and carbonized.

Standardization of core sizes will undoubtedly be given more consideration when the car manufacturer and engineer learn of the savings possible by permitting the radiator manufacturer to equip for production on a more stable basis. At present his equipment must be very flexible. He has to build any size and any shape or design. Standardization undoubtedly will follow in the types of fittings used for centering the hood or receiving the center hinge rod in support brackets and in the diameters of inlet and outlet castings. More important than this, there should be a wider use of the recommended threads for filler necks and caps.

Four-Wheel Brakes and Safety

"SPEED with safety" was suggested as a slogan for four-wheel brakes by John R. Cantley of the Bendix Brake Company in a paper on Safety and Brakes read before a meeting of the Cleveland Section of the S.A.E., Feb. 15.

His opinion was that the greatest advantages of four-wheel brakes, especially those of the internal type, were that they furnished a reserve of braking power for use in emergencies, that they enabled higher rates of speed to be maintained with safety and that they provided better control of car movement in the heavy traffic which is generally found on the country's highways.

Mr. Cantley's opinions were reinforced by letters he had received from 28 engineers, 20 of them being engineering heads of well known automobile companies, in which the engineers gave views concerning the value of four-wheel brakes. Much of the paper consisted of quotations from these replies.

Eight replies stated directly that safety is the outstanding feature of four-wheel brakes, because they make driving safe not only for the driver and passengers, but also for other cars on the road and for pedestrians as well.

Rapidity of deceleration was the text of four replies, one man writing that in his opinion the time is not far distant when a rate of deceleration will be legally demanded which will make four-wheel brakes mandatory in most cars.

An engineer who had just completed a trip across the continent believed that four-wheel brakes, by increasing the radiation surface, effect considerable reduction in wear and tear on both drums and liners. His experience in negotiating streams, sand and such unfavorable roadbeds during his tour made him very favorable to internal brakes.

Four-wheel brakes have done much to offset the hazard of high-speed driving by both experienced and inexperienced drivers and have increased the average speed from point to point through the ability to make real emergency stops, wrote another man.

An advocate of internal four-wheel brakes wrote "Four-wheel brakes are the greatest of all safety devices produced since the inception of the automotive industry, for the following reasons: driver confidence, accuracy in stopping when desired, reliability, durability, equal distribution of braking strain on all four wheels and longer tire life."

Four-wheel brakes have practically eliminated weather conditions as a factor in stopping, wrote another man, since they have taken away the old fear of skidding badly when trying to make an emergency stop on slippery pavements.

Danly Removable Leader Pin

A LEADER pin which can be quickly removed and replaced in the shoe of a die set without the use of an arbor press has been placed on the market by Danly Machine Specialities, Inc., Chicago, Ill. Use of this pin permits the die to be ground without removing it from the die shoe and after grinding the die shoe can be replaced in the press with the assurance that the die remains accurate. The pin is drilled through the center and one end is left

Section view of Danly removable leader pin

open while the other is turned taper to fit a hardened taper pin. To assemble the pin in the shoe it is pushed upward into place and the taper pin is driven in to expand and set it accurately. A wick is inserted in the pin to govern the flow of lubricant from the center of the pin which serves as an oil well through holes drilled in the sides to the usual outside oil retaining grooves.

The pin is made of steel hardened and ground within limits of .0002 in. from listed diameters. It is available in sizes from ½ in. diameter by 4 in. long to 3 in. diameter to 14 in. long. Intermediate sizes increase in steps of ¼ in. in diameter and ½ in. in length.

ACCORDING to Sir H. Burgoyne, the system prevalent in England of strongly cambering roads is an increasing danger. Heavily loaded trucks are forced on such roads to keep to the crown, and he had seen many cases in which, on drawing to one side to allow a faster vehicle to pass, the back wheels had skidded down the camber in a most alarming manner. Roads should be bedded as nearly level as is commensurate with proper drainage. Round the corners roads might well be banked.

What's New?—*Developments of*

Self-Opening Namco Die Head

THE National Acme Co., of Cleveland, O., has developed a new self-opening die head for use on multiple spindle automatic screw machines and other equipment where a live spindle requires a revolving die. This tool illustrated here replaces the older Namco die known to the trade as the OH-64H.

Style R die head is hardened and ground throughout, and is a simple tool, comprising only ten parts, not counting the chaser and the wrench. The chasers are opened and closed by cams located on the inside wall of the cup or hood. Opening and closing are effected by a spool on the back of the hood, as in other Namco revolving die heads, but in the Style R this spool is an integral part of the hood, and a very simple attachment, a fork fitting into the spool can be used to operate this die head.

Adjustment of the tool for the proper cutting size is effected by means of two parallel adjusting screws in the side of the hood, one screw being loosened and the other tightened, and the adjustment is indicated by a micrometer scale on the hood. This adjustment can be made without removing the tool from the machine. This new die head is built in seven different sizes, with cutting capacities which range from ⅛ in. to 2½ in. diameter.

Namco Style R self-opening die head and parts

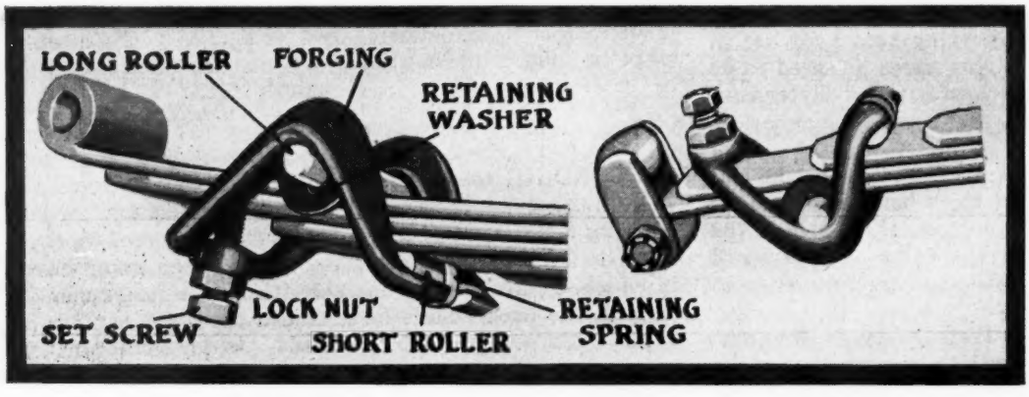
"Hexdees" Spring Control

ONE of the largest makers of automobile springs is now ready to offer to car manufacturers and the replacement-accessory trade a new type of self-contained spring control device which on account of its unusual simplicity of design will be marketed at a low price.

Known by the trade name "Hexdees" and manufactured by the Detroit Steel Products Co., the new device is mounted directly on the springs, its object being to increase the amount of inter-leaf friction and dissipate a greater part of the energy of the initial impulse, thus giving smoother riding through reducing the "up" and "down" travel. On cars equipped with the conventional semi-elliptic springs, six of the attachments are necessary. Two "Hexdees" are installed on the front spring, one being placed at either end, while only one "Hexdee" placed near the rear end is employed on the rear spring.

A monkey wrench is the only tool necessary to install a complete set of six "Hexdees," the entire operation including the adjustment occupying less than thirty minutes. Once in place no further attention need be paid to them and they can be transferred from one car to another as desired. "Hexdees" may be fitted to any make of car, as they are adjustable to various body loadings and are available in five different sizes for attachment to springs ranging in width by ¼ in. from 1½ in. to 2½ in. wide. Prices have not yet been announced, but it is understood the retail list of four "Hexdees" as Ford equipment will be below $10, while the set of six for other cars will be less than $15 complete.

Pressure is applied at three points to the end of the springs by a set screw and two rollers which are held in place by a special double V-shaped forging. As can be seen from the accompanying photograph, there are only seven parts, which, in addition to the pieces already mentioned, include a retaining washer and spring, and a lock nut. In assembly, the forging with the set screw and nut is straddled over the spring. Next the long



View of the "Hexdees" self-contained shock absorber attached to front and rear springs

Interest—Tools and Accessories

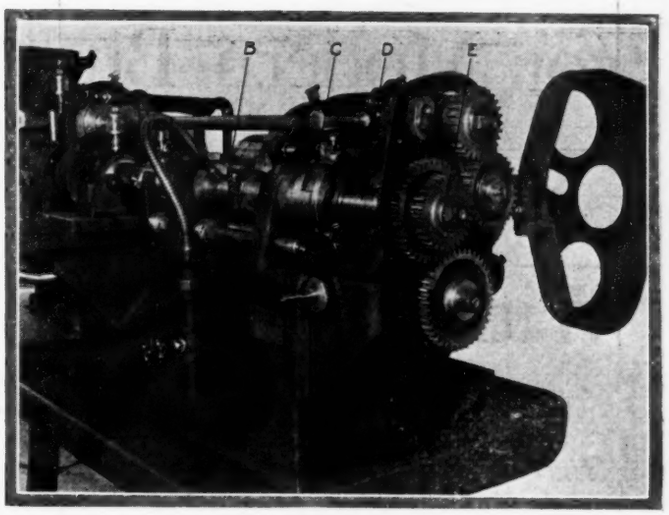
roller and washer are set in place with the short roller secured by a retaining spring. After the set screw is tightened, this point acts as an anchor and allows the rollers to operate as the leaves move. Normal adjustment calls for turning set screw 2½ turns on the front springs and 1½ on the rear.

The heat-treated forging is of S. A. E. 1045 steel with the nickel-plated rollers of special carbon steel. Laboratory tests show that the three-point contact on the "Hexdees" slowly increases the friction, which is greatest at the end of the stroke, and this leaves less energy for the spring to finally absorb and return. To give best results the springs should have the normal amount of lubricant.

Lead Screw Control Device

FOR use in cutting screw threads with a lead of a high degree of accuracy, the Cleveland Automatic Machine Co., Cleveland, Ohio, has recently developed a lead screw mechanism for application on automatic screw machines. This, in combination with change gears, provides for the rapid handling of a range of precision threaded work.

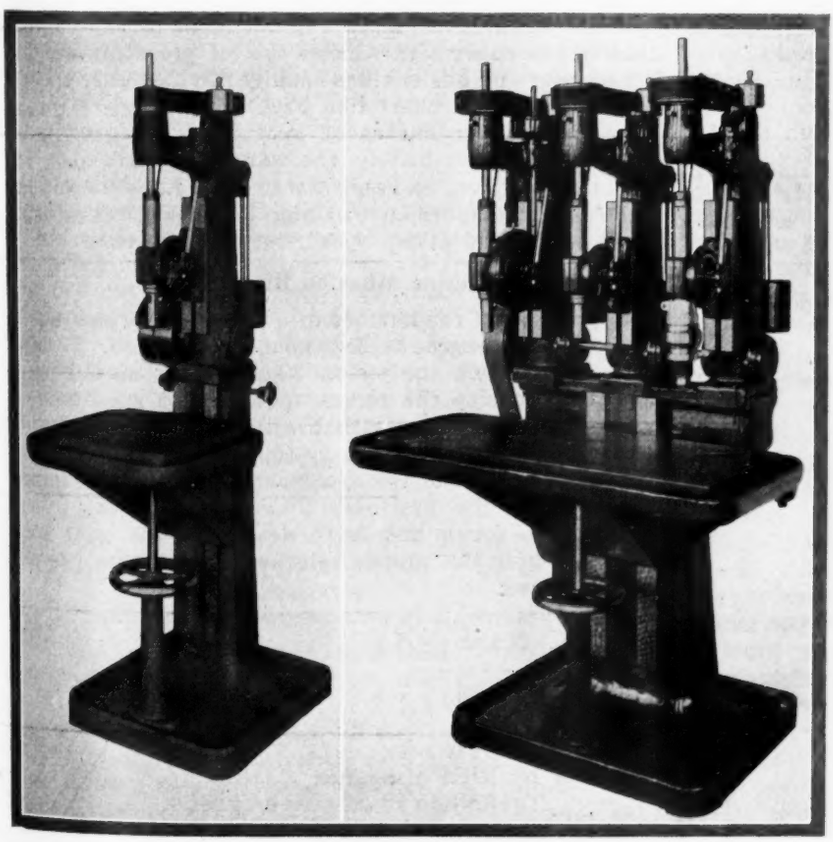
The accompanying illustration shows this lead screw arrangement on a Cleveland Model B machine which, for handling cylinder head studs, is provided with a magazine feed mechanism. The threading die is carried on the tailstock spindle B and to the rear end of this spindle there is secured a split nut carrier C that carries split



Lead screw control device on Cleveland Model B automatic

nuts engaging the lead screw D. Split nut carrier C moves backward and forward as spindle B advances the die to the work and withdraws it after the threading operation has been completed. By transposing change gears E, provision can be made for cutting threads of any desired pitch.

When spindle B has advanced the die to the work through the customary cam mechanism, a cam closes nut C onto the lead screw D. Rotation of this screw by the change gears then causes nut C and spindle B to feed the die onto the work. After the threading has been completed the die is automatically tripped. At the same time action in split nut Carrier C withdraws the half nuts from the lead screw, thus enabling the tailstock spindle B (with the die and nut C) to be returned to the starting point.



LEFT: *Taylor & Fenn 1 hand-feed drill.* RIGHT: *Taylor & Fenn No. 48 power-feed, hand-feed and tapping hand machine*

Drilling Machines

PHOTOGRAPHS are shown herewith of the two new drilling machines recently placed on the market by the Taylor & Fenn Co., Hartford, Conn. One is a simple spindle, hand-feed machine, the other a three-spindle machine with hand-feed, power-feed and tapping head. The machines are of simplified construction, designed for production work. Heads are adjustable on the column and are ball bearing throughout. By changing the spindle and rear shaft pulleys, the spindle speeds may be varied from 575 to 2300 r.p.m. That is to say, unless otherwise specified, the machine is delivered with two pulleys only, and these pulleys are selected to suit the user's requirements. By changing the pulleys the user can obtain two spindle speeds.

Designing Engine for Modern Bus Fraught With Difficulties

High road speeds, heavy loads, hard usage and demand for fuel and oil economy are factors which must be taken into consideration.

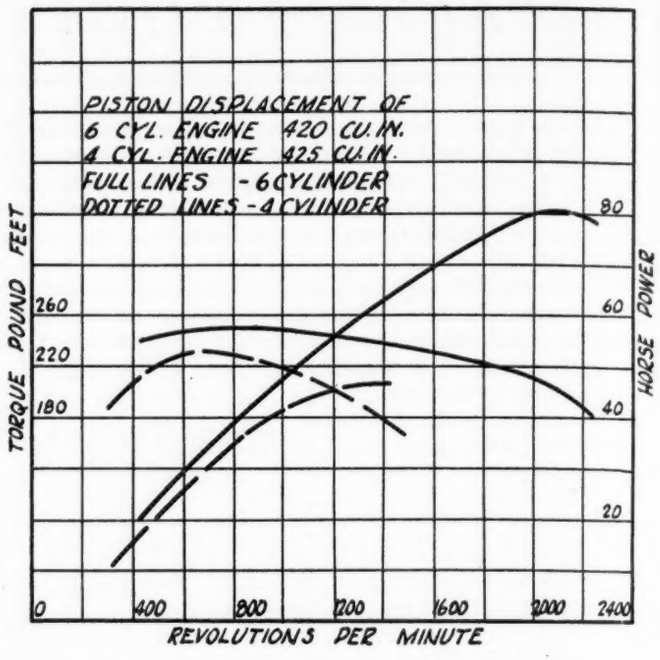


Fig. 1. Comparison of four and six-cylinder power and torque curves

INTERURBAN buses are called upon to operate at at higher average speeds than most passenger cars; the load carried is much greater in proportion to the permissible size of the engine; buses pile up a greater yearly mileage than any other type of automotive vehicle; profitable operation demands extreme long life and a high degree of reliability; efficiency in fuel and oil consumption is a requisite to satisfactory service.

These conflicting requirements for buses operating in interurban service were cited by Lewis P. Kalb, Continental Motors Corp., at a recent meeting of the Metropolitan Section of the S. A. E., as being convincing evidence of the need for more careful study in the design of bus engines.

It is impossible to design a practicable engine and still meet all these requirements. Each design must be a compromise. For example, Mr. Kalb pointed out that while fuel economy was desirable, accelerative ability of the vehicle was also of considerable importance and, other things being equal, these two factors are reciprocal functions.

Fuel consumption varies with the piston displacement per unit of distance traveled, thus

$$Q=\frac{20168 \times V \times R}{D}$$

where

V=Piston displacement in cubic inches
R=Gear ratio
D=Rolling diameter of the tires in inches
Q=Piston displacement in cubic inches per mile

On the other hand, he said, the propelling force at the tires and, consequently, the accelerative and hill climbing ability of the vehicle, is expressed by the formula:

$$F=\frac{12.15 \times V \times R}{D}$$

Thus it is evident that in an attempt to obtain too high fuel economy by either reducing engine size or gear ratio the result will be a corresponding loss in accelerative ability which may be just as bad as the waste of fuel.

Another factor which has pronounced effect on bus design is the element of smoothness in operation. The public has been educated to six and eight-cylinder passenger car performance, Mr. Kalb stated, and does not take kindly to the roughness of a four-cylinder bus engine. The unbalanced inertia forces inherent in four-cylinder engines are more objectionable in bus engines than in passenger cars because the reciprocating weights are greater and bus engines usually run at higher speeds.

By means of a chart like Fig. 1, which gives torque and horse power curves of a six and a four-cylinder engine of approximately the same displacement—420 cu. in. and 425 cu. in. respectively—Mr. Kalb showed the difference in performance at high and low speeds, during acceleration and at top speed, between the two.

Engine Must be Big Enough

Regardless of the number of cylinders, a prime requisite is that the engine be big enough for the job. To meet this requirement, the piston displacement must be sufficient to develop the torque required for good acceleration with a gear ratio that will not require excessive engine speed at the necessary top vehicle speed.

The latter part of the specification is the most important so that the first step in determining the proper size engine for a bus is to determine the gear ratio that will give the proper relationship between car and engine speed.

This relationship is expressed by the formula:

$$R=\frac{N \times D}{336.13 \times S}$$

where

R=Gear ratio
N=RPM of engine
D=Rolling diameters of tires
S=Vehicle speed in miles per hour

Bus speeds are at least equal to those of passenger cars and it is self-evident that the larger bus engines should not run any faster than passenger car engines.

The gear ratio for buses should, therefore, be somewhat less than those used in passenger cars.

Experience has shown, said Mr. Kalb, that for good engine life the sustained engine speed should not be over 1800 r.p.m.. If the sustained bus speed is to be 45 m.p.h. it is found by subtituting in the formula that the gear ratio should be approximately 4¼ to 1 for 36 in. tires. In present practice gear ratios are somewhat greater than this, being between 4.6 and 5 to 1. From this it is apparent that either top speed must be sacrificed or the engine speed must be somewhat higher than is desired.

After determining the gear ratio to be used, the following formula can be employed to determine the size of engine necessary for the desired ability.

$$T.F.=\frac{12.15 \times V \times R}{D \times W}$$

Where

V=Piston displacement in cu. in.

R=Gear ratio

D=Rolling diameter of tires

W=Total weight of vehicle

T.F.=Propelling force at drive wheels in lb. per lb. carried. This factor, known as the ability coefficient, is an index of the accelerative or hill climbing ability of the vehicle.

Solving for V:

$$V=\frac{T.F. \times D \times W}{12.15 R}$$

It is desirable, Mr. Kalb stated, that bus engines compare favorably in performance with passenger car engines, but to accomplish this would necessitate the use of engines much larger than any now in existence. For example, passenger cars have an ability coefficient of about .11. Applying this value in the above formula to determine the piston displacement of an engine for a 29 passenger bus weighing 17,000 lb. with gear ratio of 4¼ to 1, mounted on 36 in. tires, V would equal 1300 cu. in. or more than double anything found in present practice.

It is evident, therefore, that ability must be sacrified or engine speeds must be greatly increased. In present practice bus engines have an ability coefficient of about .05 which may be compared with .11 for passenger cars and .075 for trucks. From this it may be seen that the bus driver must resort to gear changes more frequently than either truck or passenger car drivers.

A high speed bus engine must be capable of developing the horsepower required to propel the bus at the desired speed. The required horse power may be determined by the formula:

$$H.P.=\frac{(.0175 W + .0129 A \times S^2}{318}$$

W=Total weight of vehicle

A=Total frontal area

S=Vehicle speed

Mr. Kalb said that the best method of comparing the horsepower required with that available was to plot both on the same sheet. In Fig. 2 he gave curves showing power required to propel a 29 passenger bus weighing 17,000 lb. and having a frontal area of 45 sq. ft. Plotted with it are power curves of a 549 cu. in. engine. These last curves are plotted to three scales representing gear ratios of 4¼, 5 and 6 to 1, the wheel diameter being 36 in. in each case.

In this way it becomes evident at once that the curve for the ratio 4¼ to 1 gives the best condition because

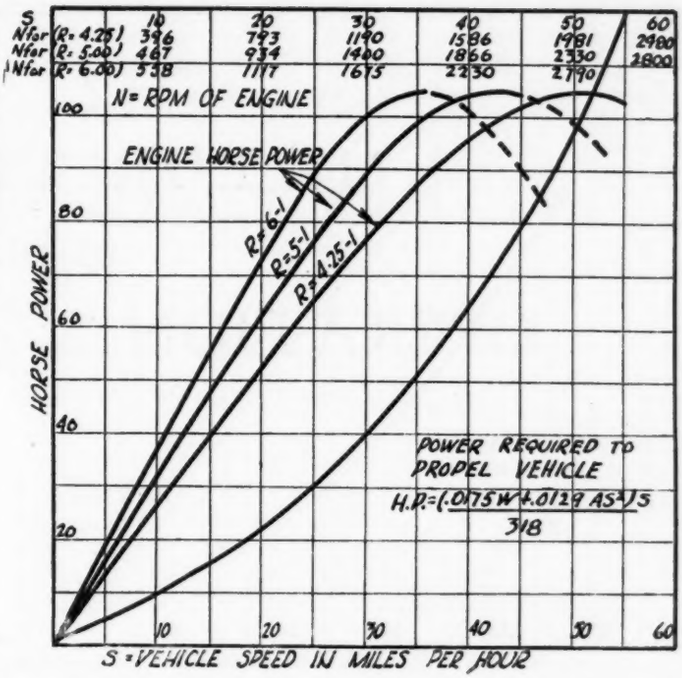


Fig. 2. Relation of available power with different gear ratios to power required on a level road

the curve of power available intersects the required power curve at the peak of the former.

Due to the low accelerative ability of interurban buses there is always a temptation to increase gear ratios so that it becomes desirable to limit engine speeds by governors. A governor is more necessary for a six-cylinder engine than for a four because the inherent smoothness of a six allows it to be operated at excessive speeds without discomfort or warning to the driver.

Centrifugal and inertia forces increase in proportion to the square of the engine speed while power output does not even increase as the first power. Mr. Kalb had compared these loads in two actual engines, one of 549 and the other of 268 cu. in. displacement. Since the larger engine develops twice the torque of the smaller, the gear ratio can be half that used for the latter if the two engines are to give the same performance in the same weight vehicles. This means that for the same car speed the engine speed of the smaller engine would be twice that of the large one, so he calculated the bearing loads at 1500 r.p.m. for the large engine and at 3000 r.p.m. for the smaller. The bearing loads of the smaller engine are over three times those of the larger.

Mr. Kalb made a number of suggestions for details of bus engine design. Among them were the following:

Seven main bearings should be provided for six-cylinder engines.

The crankshaft must be stiff enough to prevent torsional vibration at operating speeds and this calls for larger bearings and larger amounts of lubricating oil, which should be pressure fed.

Main and connecting rod bearing caps should be babbitted directly.

Water spaces must be ample, especially around the valves and a large amount of water must be circulated.

Close grained iron cylinders and aluminum crankcases were recommended.

To meet the loads imposed upon the engine by the numerous engine accessories required for bus operation, the timing gears must have broad faces and be either of case hardened low carbon steel or of high carbon alloy steel, heat treated.

MOTOR TRANSPORT
to become
OPERATION & MAINTENANCE

OUR readers, especially those in the truck and bus fields, will be interested in the announcement that, beginning with the May issue, the name of MOTOR TRANSPORT, published by the Chilton Class Journal Co., will be changed to OPERATION & MAINTENANCE. This name is believed to more adequately describe the field in which the magazine has served with enviable results in the past. At the same time that the name is changed the editorial scope will be enlarged to meet more thoroughly the specific needs of motor truck and motor bus operators and to make the contents of infinitely more value to this class of reader.

For many months the editors and executives of the Chilton Class Journal Co.—the largest publisher of automotive business papers in the United States—have been concentrating on the development of an editorial policy for a fleet operators' publication which would more adequately serve the needs of the bus and truck operators.

Two Major Problems

Complete facts secured through thousands of questionnaires and personal calls show that the major problems of all bus and truck owners are grouped under two classifications:

1. Operation
2. Maintenance

The fleet operator needs more than anything else a business publication which will devote its entire energies and resources to the discussion and analysis of these two most important phases of bus and truck handling.

OPERATION & MAINTENANCE will be edited for both the bus and truck operator as has been the policy in MOTOR TRANSPORT. This is logical because the operation and maintenance of buses and trucks are identical. Both are commercial vehicles—one carrying passengers, the other freight.

Buses and Trucks Go Together

Many owners operate both buses and trucks, as is particularly the case with the big independent bus lines, large traction companies and steam railroads. In nine cases out of ten, the bus comes out of the same factory as the truck; in fact, truck engineers have been the ones to design buses. The same purchasing agent buys for both buses and trucks, also the same sales organization is responsible for the sale of the majority of buses and trucks. The same mechanic who overhauls the bus motor, overhauls the truck motor. Maintaining a truck chassis is not different from maintaining a bus chassis.

A greater amount of editorial space will be devoted to maintenance problems, because no matter what the make of truck or bus, whom it was bought from, or what it cost, proper maintenance determines the relative success the owner has with that vehicle.

Under the subject of maintenance will come engine and chassis overhauling, body repairing and overhauling, painting, washing, care of tires, lubrication, machine tool operation, service station equipment, replacement parts, handling, hiring and training of mechanics, service station cost records, etc.

Subjects Coming Under Operation

Under the heading of operation will be discussed the handling of drivers, cost accounting, routing, scheduling and dispatching, purchasing, terminal facilities, etc.

None of the value which MOTOR TRANSPORT has rendered its readers will be sacrificed in this change, rather the editorial effort will be more concentrated.

The focusing of the editorial policy of the new publication on the two major problems will make OPERATION & MAINTENANCE an ideal business paper for the modern type of fleet transportation superintendent whose main effort is to increase the efficiency of his units and eliminate all waste. Editorially, the magazine will stand for exactly the same principles—efficiency and economy. Articles will be written as briefly as possible and profusely illustrated in order to conserve the reader's time.

Typographically OPERATION & MAINTENANCE will take its place among the best designed and edited business papers in the country.

The editors expect to make this publication so informative that its influence with its readers will make it the most widely quoted and used fleet operators' publication this field has ever known.

Iron Chief Trouble-Maker in Storage Battery Manufacture

Particles of this metal in materials result in defective batteries and must be closely guarded against. Copper, tin and arsenic also injurious. Inspections and tests rigid.

AN outline of the checks applied to the materials entering into the construction of storage batteries, of inspection operations during fabrication, and of the tests applied to completed batteries in order to insure uniformity of quality, was given in a paper presented at the Chicago convention of the National Battery Manufacturers Association by A. L. Reid of the U. S. Light & Heat Corp. Following is an abstract of the paper, covering the more important points brought out in it.

All materials entering into a storage battery must be tested, the materials of the elements chiefly with regard to their purity. First comes the material of the grids. The reason impurities in the lead-antimony alloy are injurious is that in service the grids corrode to a greater and greater depth, and any impurities in them are dissolved by the electrolyte and become active in the cell.

The more important impurities in the grid metal are arsenic, tin, copper and iron. Arsenic and tin are not very pronounced in their effects, though they tend to cause internal discharge of the negative plates when the cells are idle. Copper has a similar effect, but its action is much more pronounced, consequently it must be more carefully guarded against and the permissible limit set lower. These metals are deposited on the active material of the negative plate and form minute voltaic cells which discharge the plate. When two or more impurities act in this way, the discharge effect is much more pronounced than if each were active alone.

Iron is Most Injurious

Iron is probably the most injurious of all impurities commonly met in storage battery materials, for its action is to rapidly discharge both the positive and negative plates on open circuit. Because practically all the equipment used in making up the lead alloy and the battery oxides is of iron, the resulting materials are invariably contaminated to some extend with this very undesirable impurity. Iron exists in two forms, the ferrous or bivalent and ferric or tri-valent. Under proper influences it readily changes from one to the other, and it is this property which renders it so troublesome in the cells of a storage battery.

The ferric iron migrates to the negative plate, where it changes to the ferrous by loosing one of its charges to the plate. As this charge is positive it tends to discharge the negative plate. The ferrous iron then migrates to the positive plate, where it is again oxidized to the ferric condition, taking a charge from the positive plate and thereby tending to discharge it. This action is continuous and proportional to the quantity of iron present. At normal temperature it takes but 0.5 per cent of iron in the electrolyte to completely discharge a battery on open circuit in 20 days.

Impurities in the active materials are even more important than those in the grids, because the whole of these impurities will enter the electrolyte, and their detrimental effects begin as soon as the battery is built. For this reason the oxides are covered by very rigid specifications. Iron is the most common impurity, and unless the utmost care is exercised it will enter in excessive quantities, and once there, it cannot be removed. Copper can be kept down by using low-copper lead for oxide manufacture, whereas the iron is accumulated during the process of manufacture.

Broad Control Necessary

The other metallic impurities in the active materials are almost negligible in quantity, because in the production of lead for subsequent oxidation, better control is possible than in the production of the grid alloy, yet a broad analytical control is necessary to guard against their introduction through variations in the lead ores or through some failure in the refining process.

It is necessary also to check the physical properties of the oxides, such as their apparent density and their texture, as well as their chemical activity. Owing to the fact that profits in the battery business are low and extensive guarantees are given, it is of the utmost importance that the manufacturer protect himself against losses caused by faulty materials. Even though he makes good on his guarantee, such troubles will have a depressing effect on future sales.

The third active material in the battery is the electrolyte—dilute sulphuric acid. It is into this that the impurities of the grid and active material find their way in the form of soluble sulphates. Iron again is the chief impurity, but it is not likely to be present in as large a proportion as in the oxides. Another likely impurity in the electrolyte is foreign acids, which, unlike metallic impurities, have the effect of increasing the capacity of the battery, but at the expense of its life.

These foreign acids have a corrosive effect, attacking the active materials and the grids, making them more porous or spongy, and practically washing the material away. The degree of injuriousness of these acids is indicated by the fact that U. S. Government Specifications for electrolyte limit the nitric acid content to 0.004 per cent. Ammonia and organic matter also cometimes find their way into battery electrolyte. When present in small quantities (less than 0.005 per cent) they are not considered dangerous, while in large quantities they certainly are injurious. Ammonia tends to decrease the capacity of the cell, while organic matter tends to prevent charging of the positive plates. Ammonia remains in the cell permanently, while organic matter is gradually destroyed The occurrence of both of these impurities in excessive amounts must be guarded against,

All jars are subjected to a high voltage test, which shows up any slight crack, hole or weak spot not visible to the naked eye. Also, sample jars are selected at random and tests made on the materials for tensile strength and elongation, which together determine the resistance of the material to breakage. Similar tests are made on the covers.

The sealing compound is a mixture of asphalts and oils, and in some cases fillers, and it must be not too soft at high temperature, nor too hard at low temperature; it must have good adhesive properties and must not crack under normal service conditions. The melting points are determined, penetration tests are made, and the adhesive properties are ascertained. Pyrometers are installed in the melting pots in the assembling departments to prevent overheating of the compounds, which would result in driving off some of the oils and rendering the compound brittle.

Inspection Department

Control of the partly finished materials is in the hand of the inspection department. Grids are inspected for defects, and the plate pasting process is similarly checked. An inspector's duty, aside from rejecting defective material, consists in informing the foreman regarding any rejections and the reasons therefor, with a view to preventing their recurrence.

In the forming department the duties of the inspector involve adjusting the specific gravity of the electrolyte, before any plates are placed in it for forming. He must also see that the plates are properly stuck and that good burning is effected. During forming he must see to it that the charging rate is correct.

Lead run-downs for the group assembly department are the most serious problems of inspection, they being probably the most difficult defect to locate. They result in "shorting" the whole tank, causing excessive rejections. Groups lacking a separator will act in the same manner, but are more easily found.

Leaky cells are determined by the U. S. Light & Heat Corp. by measuring the electrical resistance between the top of the link and the bottom of the case by means of a Wheatstone bridge. An alternating current is used, together with a telephone receiver as a detector. The bridge is balanced for a good battery; in case of a defective battery the resistance between the link and the base is lowered, the bridge is unbalanced and the telephone receiver gives an audible indication. This method is patented.

One battery out of every 500 built is sent to the laboratory, where it is put on discharge at the 20-minute rate. It must deliver its rated capacity with voltage readings equal to or above a minimum curve, which curve is considered to represent satisfactory performance. If the test battery fails the entire lot from which it was taken is held up until the management is satisfied that they are capable of the required performance.

Retail Financing Methods

(Continued from page 439)

not do, particularly in anything having to do with finances.

It is evident from the conflicting views, even within the manufacturing group, that a gradual development and readjustment in retail financing methods is to be expected for a good many months to come. Except as to recourse and non-recourse, there is no sharp line of division between the general dealer views and the general manufacturer views on the subject. As indicated in the opinions already quoted, the N. A. D. A. resolutions have not been met in any general spirit of opposition by the manufacturers. On a good many points the factories and the dealers are in agreement. Responsible representatives of both groups are urging strongly that terms be held to conservative limits and that down-payments be made sufficient for safety. With a few exceptions there seems to be no tendency on the part of manufacturers to urge extremely liberal installment terms in an effort to have dealers move cars and permit higher production levels.

The extent to which the car makers in some cases agree with the dealer views on retail financing is indicated by the following statement which is from the sales manager of an important car company:

"We do not hesitate to indorse the recommendations of the National Automobile Dealers Association as presented to the National Association of Finance Companies, as follows:

"First: That all finance companies adhere to the rules of requiring a one-third down payment and completion of the deal within twelve months on new car financing.

"Second: That commercial banks revise their standards of commercial credit to allow greater credit to automobile dealers with fast turning lines of merchandise than to other merchants whose lines move more slowly—turnover should be given greater stress in determining ratios of credit to net worth. (In connection with the foregoing, the standards of commercial credit allowed to automobile dealers should also be governed largely by the individual dealer and not entirely the line of goods handled).

"Third: Absolute elimination of all dealer endorsement of customer paper as a means of removing a legal contingent liability which is not understood by the commercial banker and which shortens the actual credit granted by banks to dealers.

"Fourth: That where automobile dealer indorsement is required, despite our previous recommendation upon this point, the dealer be allowed to charge a sum sufficient to set up an adequate reserve to cover himself for the risk he is guaranteeing.

"In connection with fourth paragraph, quoted above, this proposal should be very carefully governed, if possible, by the factory so that dealers will not charge excess amounts or premiums that in turn would hurt the sale of the goods."

And here is what some other sales managers say:

"My first thought about the N. A. D. A. resolutions," write one sales manager, "is that they constitute a step in the right direction."

"I feel," says another, "that in a general way the resolutions on retail financing are sound and for the best interest of the industry. . . . It is easy enough to realize how competition, as it grows more pronounced, gets down to a matter of terms, but I doubt seriously if a standardization of terms would interfere seriously with the total volume of automobile business done."

"There is much to be said for and against the N. A. D. A. financing resolutions," writes a third. "I will say most emphatically that I am heartily in favor of a stabilization of finance rates based on a sound business-like basis for the manufacturer, the dealer and the finance company."

The financing methods finally used to the greatest extent by the industry probably will be determined by gradual success or failure of plans and policies now being worked out, rather than by any specific resolution or legislation on the subject. The definition of objectives and clarifying of desires resulting from the N. A. D. A. resolutions and the subsequent comments obtained concerning them should, however, help to bring nearer a complete understanding of the problems and conflicting interests involved.

EDITORIAL

Heat Conductivity of Valves

THERE have been great developments in connection with engine valves in recent years, but most of these have been in the way of the discovery of new materials which will stand up better under the high temperatures which the exhaust valve generally attains, rather than means for reducing the working temperature of the valve head without reducing the compression.

The maximum temperature attained by the valve head depends to a large extent upon the rate at which the heat absorbed by it can flow off. This in turn depends upon the heat conductivity of the valve material and upon the surface area of the valve seat relative to the surface area of the valve head exposed to the hot gases.

In this connection it is of interest to note that most of the special steels used for valves have a materially lower heat conductivity than ordinary carbon steels. Apparently nothing has been published regarding the thermal conductivities of the latest valve metals, but the conductivities of some of the alloy steels formerly used for valves are known. Representing the conductivity of 0.30 per cent carbon steel by 100 per cent, that of 5 per cent nickel steel is only 70 per cent, that of 13 per cent chrome steel, 30 per cent and that of 30 per cent nickel steel, also 30 per cent.

Observation of exhaust valves in engines under load shows that the temperature of the head decreases from the center toward the edge or toward the seat, and the difference in temperature between the center and the edge will be less the greater the heat conductivity of the metal. Attention has been called recently to the fact that the specific gravity is one of the important characteristics of a valve material for high speed engines. It would appear from the above that the thermal conductivity is a property of at least equal importance.

A Banker Comments

"Installment selling in good times is concrete highway selling—we can only guess what will happen when it hits the dirt road of a poor year." Thus succinctly does O. H. Cheney, vice-president, American Exchange & Pacific National Bank, comment on current trends in automotive selling. Mr. Cheney admits, as a banker, that "automobile finance paper, past and present, has been surprisingly good and that losses have been very low" but adds that "there is nothing inherent in the plan to make the paper good forever and under all conditions."

Mr. Cheney's remarks are of interest because he is an experienced banker and because he made these particular remarks to the Association of Uptown Bankers in New York recently. That his estimate of the situation is logical cannot be denied and the note of warning implied in the expression "surprisingly good" is worthy of note.

Events of the last few months in the automotive financing field have indicated, however, a rather full realization on the part of automotive executives that sound instalment business, based on proper credit investigation and conservative terms, is the only proper foundation for the automobile selling structure. While extremely liberal terms still are to be found in many places, there is less tendency every day among responsible executives to sanction or condone unsound practices in hope of temporary advantages.

Displacement and Taxation

A MOVEMENT was started in Europe some time ago to do away with the piston displacement as a basis for the calculation of the annual tax on motor cars. In many European countries the annual tax is a very important item in the budget of the motorist and is particularly onerous to the less well-to-do classes that are now beginning to take an interest in motoring. The argument has been advanced that it is unjust to ask the same tax from the owner of a cheap, utilitarian car as from the owner of a luxurious sport model which, though perhaps of the same piston displacement, may have cost five or more times as much when new.

Such a law has been passed by one of the Swiss Cantons, and a similar law has been under consideration in France. Evidently these laws are intended to shift some of the burdens of taxation from the shoulders of the masses to those of the classes

In France there has been determined opposition to this method of taxation on the part of the home industry. It is argued that it would be a blow to the French industry, which makes use chiefly of high speed, high efficiency engines of small displacement, which latter benefit from the piston displacement tax law that increase in piston speed and consequent reduction in piston displacement is the logical line of progress, and that this would be blocked by the proposed legislation.

What all of the European taxation laws basing the tax on the piston displacement profess to tax is the horsepower available for the propulsion of the car. Piston displacement would be a fair basis if the horsepower were proportional to it, as the wear and tear of the road undoubtedly bears a fairly close relation to the power available. But now that limiting piston speeds vary all the way from slightly over 1000 to well over 3000 ft. p. m., there is really very little relation between the two factors.

AUTOMOTIVE NEWS SECTION INDUSTRIES

Philadelphia, Pennsylvania

Thursday, March 11, 1926

Price Reduction Expected to Stimulate Car Business

PHILADELPHIA, Mar. 11—Stimulation of motor car sales is expected to follow the reductions in delivered prices announced by many of the manufacturers in consequence of the signing of the new revenue bill. Although the lowering of the tax on automobiles from 5 to 3 per cent does not become effective until Mar. 29, the producers in most cases, to avoid any slackness in sales during the intervening period, have agreed to anticipate the reduction.

These cuts in delivered prices average about $11, this figure being based on the average price of all automobiles sold, but the reductions on the more expensive cars go to more than $100.

A rather high sales level during March is needed to keep the industry in sound condition as to stocks of unsold cars, in view of the large output of vehicles in February and the record rate at which a majority of the large producers are turning out cars this month. Sales in February were satisfactory, considering the season of year, but the heavy snowstorms were strongly unfavorable factors in some sections of the country.

Southern Business Good

Good business throughout the south served to counteract the slackness observed in the north. With the return of open weather generally, it will be soon possible to gage more definitely the market possibilities in the rural sections above Mason and Dixon line.

The stock market reaction was regarded as without direct significance for the automobile industry, whose leaders are convinced that the business of the country is on a sound basis and should continue prosperous indefinitely. The market decline, in other words, is regarded as wholly technical. The proportion of motor car buyers who speculate in stocks, and who therefore might have suffered losses that would damage their purchasing power, is not considered large. The expansion of time selling has reached millions of persons who never think of stock market operating.

Export activities of several large companies are undergoing great expansion. Formation of new branches, acquisition of foreign factories and assembly plants, and private shipping lines are some of the means being taken to reach the foreign market more efficiently.

Messick Elected President

INDIANAPOLIS, Mar. 11—The Robbins Body Corp. announces the election of A. G. Messick as president to succeed U. McMurtrie.

N.A.C.C. Sees Car Trade on Firm Basis

Need for Strengthening Sales Forces Apparent—To Study Bus Laws

NEW YORK, Mar. 8—At the quarterly meeting of the members of the National Automobile Chamber of Commerce last week, there were clear indications of the conviction that the automobile industry is now on a sound basis and has nothing to fear from temporary stock market set-backs.

That car producers realize the necessity of strengthening sales organizations in the field until they show an efficiency comparable to that in the production branch of the industry was indicated both at the car members' meeting and at the meeting of the truck members.

To Cooperate With N. A. D. A.

It was voted again to cooperate with the National Automobile Dealers Association in a series of sales conferences this year. The resolutions on financing recently adopted by the N.A.D.A. were mentioned only incidentally.

A sub-committee of the truck committee reported completion of the plan by which truck and bus makers may subscribe to a monthly vocational census of truck and bus owners throughout the country.

Study of the refund provision of the new tax law occupied most of the members' meeting at a morning session.

On the method of applying the refund provision on Mar. 29 many questions were answered by C. W. Stewart, assistant to the chief of the tax division of the Internal Revenue Bureau, and John E. Walker, former tax advisor to the United States Treasury.

John J. Raskob reported progress in the plans of the American Motor Rubber Corp.

The N. A. C. C. members considered a proposal from the directors that the amount of car stock on dealers' floors as of the end of each month be reported for use by the manufacturers in connection with production figures and plans, buts this proposal was left in abeyance.

With M. L. Pulcher, president of Federal Motor Truck Co., presiding, one of the most important decisions made by the truck members was that a conference committee be appointed including representatives of the N. A. C. C., and S. A. E., and perhaps of the A. E. R. A., and other interested organizations, to work out a bus specifications code that would help to decrease the tendency of state legislatures and commissions to adopt regulations which hamper manufacturers by requiring varying specifications in different states.

Conflicting State Laws

This action followed an exposition by G. H. Scragg of Mack Trucks, Inc., of many conflicting state regulations affecting specifications, which in some cases, make it almost obligatory upon the manufacturer to devise a special model if he wishes to sell his product in a certain state.

H. J. Dooley, secretary of the Motor Coach League of New England, described the bus situation in Massachusetts, where court decisions have practically outlawed intrastate bus companies. He urged bus makers to come to the assistance of Bay State independent bus operators is supporting a bill which will alleviate this situation.

The truck committee rejected a proposal from the underwriters for a 10 per cent reduction in fire insurance rates on trucks with a provision that certain model details be governed by examination in the underwriters' laboratory.

Dealer-Directors on Dodge Bros. Board

DETROIT, Mar. 10—C. M. Bishop, of Brooklyn, N. Y., and F. S. Albertson, of Los Angeles Cal., have accepted positions on the board of directors of Dodge Bros., Inc. They will be formally elected at a meeting of the board this month.

Direct representation of dealers on the board was suggested by Clarence Dillon at the dealer convention held here in January. The plan calls for rotation in office of dealer-directors each year, so that every section may be represented.

Messrs. Bishop and Albertson are both original Dodge dealers, having been identified with the organization since 1914, the year the company was founded by John and Horace Dodge.

Mr. Bishop is general manager of Bishop, McCormick & Bishop, of Brooklyn, and Mr. Albertson is president of the Albertson Motor Co., of Los Angeles.

Continental Prepares Argyll Engine Output

World-Wide Rights and Patents Held—Cheaper, Quieter Features Emphasized

DETROIT, Mar. 11—The Continental Motors Corp., which recently bought the world rights and basic patents, including Great Britain, for the building of engines embodying the Argyll sleeve-valve principle, announced this week that it would go into production on engines of this type within 90 days. Due to the fewer number of parts, it is expected that the Argyll engines can be produced at a lower cost than the conventional types, according to W. R. Angell, executive vice-president of the company.

The adoption of the Burt-McCollum or Argyll basic patents and principle represented the first radical change in engine construction that had seriously interested this company in the last 25 years, Mr. Angell said. Simplicity, longer life, greater reliability and quieter operation are the salient features prompting the company to adopt this type of power plant.

New Equipment Not Needed

Continuing, Mr. Angell said that quantity production could be maintained with the present factory equipment, and with no additional investment in special machine tools.

A. N. Niven, one of the engineers who pioneered the development of the Argyll engines in Scotland, is now employed by the Continental Motors Corp., and has built in the Detroit plant an Argyll engine, which, it is said, has given surprising results.

It is reported that Anthony G. Fokker, the airplane designer, has approached the company in an effort to induce the construction of an air-cooled airplane engine, embodying the Argyll principle.

The sleeves of the engine just developed are of cast iron and are 3/32 in. in thickness. The engine has six cylinders of 2⅞ x 4½ in. bore and stroke, and delivers 57 b. hp. at 3000 r.p.m.

Chrysler Sees Good Car Business Throughout 1926

NEW YORK, Mar. 9—From his observations on his western trip, just concluded, Walter P. Chrysler disagrees with those who express doubt about continuance of good automotive business through the last six months. He is convinced that if the whole country faces the future with the confidence in prosperity clearly evident throughout the West, the industry will agree with his view that its present prosperity is not temporary and that there is no reason why the last half of this year should be less successful than the first half.

Seldom has Mr. Chrysler returned from an observation tour with such enthusiasm as to the soundness of business conditions. He takes issue with the critics who are now insisting that too many cars are being produced and he believes that only those companies will be guilty of over-production which fail to get their share of the competitive business in their price fields.

He makes the point that the automobile dollar buys more value than any other dollar today, with many families buying two cars and with nearly all owners getting more use out of their cars than ever, and he thinks that traffic congestion and lack of adequate highways are much larger obstacles than any danger of a production saturation point. He cites the fact that in Los Angeles, where much imagination and courage have assisted in solving the traffic and highway problems, to a large degree, every 2 7/10 persons own a car.

Would Change Theft Insurance Grading

NEW YORK, Mar. 10—The insurance committee of the National Automobile Chamber of Commerce has asked for the reaction of the Chamber members to the proposal of the National Automobile Underwriters' Conference to use in 1927 a new method of theft-grading, based on three groups of cars: Standard, semi-standard and non-standard.

Under this plan the Conference would establish a minimum rate for each car from experience data and specified credit deductions would be made for the locks.

Peerless to Finish Cars Entirely in Lacquer

CLEVELAND, Mar. 10—Hereafter all cars turned out by the Peerless Motor Car Co. will be completely finished in lacquer. Bodies have been finished in lacquer by the Peerless company for some time, but, from now on, the fenders, hood, sills, dust and splash shields will also have a lacquer finish, instead of the usual baked enamel finish.

The chief advantage to the user of the new process of finishing is said to be that if such parts as the fenders are damaged in service by light collisions, it is much easier properly to refinish the marred places after the bumps have been taken out by hammering.

Freeman V.-P. of Gardner

ST. LOUIS, Mar. 10—L. C. Freeman has been elected vice-president in charge of engineering and production, according to an announcement made today by The Gardner Motor Co., Inc. This phase of the Gardner business has been under Mr. Freeman's personal supervision for the last nine months and many of the advanced characteristics of the Gardner eight-in-line and Gardner six were sponsored by him.

The new vice-president has had wide experience in engineering.

Business in Brief

Written exclusively for* AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.

NEW YORK, Mar. 11—The spectacular decline in stock prices, bringing on Wednesday the greatest volume of transactions in the history of the Exchange, was easily the outstanding financial event of last week. Liquidation in stocks was accompanied by weakness in most of the leading speculative commodity markets. Industrial and trade reports, on the other hand, were more generally favorable than for several weeks past.

MAIL ORDER HOUSES

Sales of the two leading mail-order houses last month amounted to $36,267,277, as compared with $37,857,851 in January, and $33,756,013 in February last year.

CAR LOADINGS

Railway freight car loadings continued to increase during the week ended Feb. 20, numbering 931,743, as against 917,144 a week earlier, and 925,886 a year ago.

BUSINESS FAILURES

Business failures reported to Bradstreet's for the week ended Mar. 4 numbered 372 as compared with 390 in the preceding week, and 363 in the similar period of 1925.

BANK DEBITS

Bank debits to individual accounts reported to the Federal Reserve Board for the week ended Mar. 3 were 41.2 per cent larger than the total for the preceding (holiday) week, and 15.9 per cent. above that of a year ago.

BUSINESS INDICES

Fisher's index of wholesale commodity prices stood at 154.0 last week, as compared with 155.5 in the previous week, and 159.6 four weeks earlier. Dun's monthly wholesale price index reflected a decline of 1¼ per cent, and Bradstreet's index a decline of 2⅛ per cent in February.

FEDERAL RESERVE STATEMENT

Bills and securities held by the Federal Reserve banks increased $22,400,000 during the week ended Mar. 3, with a gain of $43,100,000 in discounts, only partially offset by declines of $17,500,000 in open market purchases, and $4,800,000 in Government securities. Note circulation decreased $4,000,000, and reserves $3,000,000, while deposits rose $40,100,000. The reserve ratio declined from 74.0 to 73.2 per cent.

MONEY

Call loan rates were slightly lower last week, ranging from 4½ to 5½ per cent, as against 5 to 5½ per cent a week earlier. Time loan and commercial paper rates were unchanged at 4¾ to 5 per cent and 4¼ to 4½ per cent, respectively.

Better Automotive Demand for Steel

Trend Still Along Cautious Lines—Buying Movement May Crystallize Soon

NEW YORK, Mar. 11—There has been a further moderate broadening of automotive demand for steel, and what improvement is noted in the rate of steel mill operations is almost wholly due to the increase in automotive orders.

Rollers of full-finished automobile sheets are working at virtually capacity, striving to overcome the results of curtailment in production forced upon some of the Youngstown district plants by recent flood waters of the Mahoning River. The waters, which submerged furnace pits in some cases, are now reported to have receded, and operations are once more normal in the affected territory.

Prices Rule Steady

While automotive orders are more numerous, the trend of the buying is still along cautious lines, and can hardly be spoken of as a buying movement, although steel company sales managers continue to hope for such a movement to crystallize in the next few weeks. Prices continue to rule steady rather than strong. Merchant bar mills aim to get $2.10 for second quarter business, but they are not letting any 2-cent contracts slide by.

The best that can be said for sheets and plates is that there is slightly less price-shading. Alloy steel makers have on hand a fair volume of specifications from automotive consumers.

Rumors that the leading manufacturer of low-priced passenger motor cars is back of the acquisition of a number of Colorado molybdenum mining claims have directed renewed attention to the possibility of widely-extended employment of molybdenum in automotive alloy steels.

Again, automobile cars are of paramount interest in the railroad equipment field, the Pennsylvania having put out formal inquiries for 2000 steel cars of this type.

The Metal Markets

Pig Iron—A few more inquiries for pig iron are coming this week from automotive foundries, but, on the whole, demand for second quarter deliveries continues flat. Melters appear to be serenely confident that there is no possibility of the market rising, and, therefore, are taking their own sweet time about contracting for their May and June needs, apparently having sufficient reserves on hand to carry them through the first half of April.

Aluminum—Industrial conditions in the German home market are such that an increase in the tonnage of unwrought aluminum available for export is looked for. Marketers of European aluminum have found it relatively easy to obtain the going domestic price for what shipments they have been able to obtain for this market, and there is very little likelihood of any spirited competition among the world's aluminum producers in the near future. The demand from parts makers for remelted metal continues good. Prices are steady and unchanged.

Copper—Stock market developments acted as a temporary brake on the rising tendency of the red metal, but producers are not discouraged and look for a slow, upward movement. Automotive brass demand is of a routine character.

Tin—Prices continue to hold at levels uncomfortably high from the consumer's point of view.

Lead—Storage battery demand is rather slow. The market is easy.

Zinc—Consumers bought moderately on dips, steadying the market.

Continental Motors Shipments Up 77%

DETROIT, Mar. 8—Production figures issued by the Continental Motors Corp. for the first quarter of its current fiscal year show an increase in motor shipments of 77 per cent over the same period last year.

W. R. Angell, executive vice-president of the company, said that the "healthy increase in our shipments for the first quarter of the present fiscal year was extremely encouraging. It shows that those who anticipated material increases in automobile production were correct in their belief."

March and April schedules, Mr. Angell said, called for a continuing increase over the same period last year. Contracts which the company has completed with manufacturers will increase Continental business materially during the coming months, it was said.

Reo's Labor Turnover in 1925, 21.8 Per Cent

LANSING, Mar. 8—The labor turnover for the Reo Motor Car Co. during 1925 was 21.8 per cent, less than 2 per cent per month, according to figures released by the company. This is slightly more than in 1924, when the turnover was 19.9 per cent.

The highest month's turnover was in April, when 2.8 per cent of the help was replaced. The lowest month was in July, when .9 per cent was replaced.

These figures are considered remarkable because of the greater-than-normal demand for men which existed in and around Lansing during the year.

Autocar Bond Tenders Asked

NEW YORK, Mar. 8—Bond tenders have been asked for an amount of the Autocar Co.'s first convertible 7s, due May 1, 1937, until Mar. 15, 1926, at not exceeding 107½ and interest, by the Equitable Trust Co. of New York. Accepted bonds will be delivered Mar. 25, 1926.

Financial Notes

Briggs Mfg. Co.—This company, for year ended Dec. 31, 1925, reports net income of $8,141,656, after depreciation, Federal taxes, etc., or $4.07 per share on 1,999,688 common shares, comparing with $11,135,576, or $5.56, in 1924. Fourth quarter net income was $3,048,860, or $1.52, against $1,025,485, or 51 cents, in the third quarter. January, 1926, sales exceeded the same month last year by 23 per cent, and February was 21 per cent ahead of that month in 1924. March production schedules are much heavier than in either of the two preceding months. The company goes into production on a new contract the end of March and is to build up deliveries to 500 bodies daily in 30 days. Another new contract was closed recently to July 1, 1927.

U. S. Light & Heat Corp.—This company, maker of USL storage batteries, reports 1925 as its biggest year. Sales through distributors increased 75.1 per cent over 1924 and 141.6 over 1923. More than twice as many batteries were sold to car manufacturers for original equipment during 1925 as during 1924, and this, the company reports, was due largely to the increase in the list of cars using USL batteries as original equipment. In 1925, a total of 4,094 service stations were appointed and the list of service stations and dealers now totals 10,678.

Eaton Axle and Spring Co.—This company, for the calendar year 1925, reports consolidated net income of $706,774, after charges and Federal taxes, equal to $2.83 a share on the 250,000 no par capital shares, compared with $195,451, or 85 cents, on 229,500 shares in 1924. Surplus of $352,574 compared with a deficit of $45,014 at the end of 1924. Consolidated balance sheet showed current assets of $3,014,632, compared with $2,498,046, and current liabilities of $693,244, compared with $554,044, leaving net working capital of $2,321,388, against $1,944,002.

Caterpillar Tractor Co.—Total net sales of this company for 1925 were $20,859,841, representing a gain of more than 19 per cent over the combined net sales of the Holt and Best companies, before the consolidation, in 1924. Total earnings, before interest and Federal taxes, were $4,457,559 in 1925, compared with $1,724,125 in the previous year.

Hare & Chase, Inc.—This company reports for the first 11 months of 1925, profits of $704,769, before preferred dividends. After deducting preferred and common dividends there remained $384,327 to add to the surplus, making its total $970,459. Earnings per share on the common were $4.45.

Hoover Steel Ball Co.—In the annual report just mailed to stockholders, this company places its net earnings for the year ended Dec. 31, 1925, after depreciation, Federal taxes and dividends, at $144,186.21. Current assets were $1,043,645 and current liabilities $464,673.97.

Goodyear Tire & Rubber Co. of Cal.—Shares of this company's $5,000,000 5-year 5½ per cent sinking fund gold notes, due Feb. 15, 1931, when, as and if issued have been admitted to unlisted trading on the New York Curb Exchange.

Employment at High Figure in Industry

Detroit Reports Another Record and Toledo is Ahead of Last Year

DETROIT, Mar. 6—Employment in the Detroit area showed further gain in the last week over all previous weeks, incidentally setting a new high employment record among factory workers. It was the second consecutive week that the previous high week had been beaten.

According to the Employers Association of Detroit, 271,927 workers were employed in the different factories last week. Of this number, approximately 190,000 were employed in the automobile and accessory manufacturing plants.

A year ago, the figures for the corresponding week were 211,491. The week ended Feb. 27 was surpassed by 1532.

Since the first week in February, the employment figures have steadily risen until the present figures are 8085 higher than for the week of Feb. 6. With the spring peak yet to reach its climax, employment figures are expected to show even more sensational rises.

26,075 at Work in Toledo

Toledo employment reports for the week ended Mar. 6 show 26,075 at work in 51 plants, as compared with 24,223 in the same plants at this time last year.

For the week there was a net loss of 287 employes, but the layoff is considered temporary. Willys-Overland was practically the only automotive plant to show a decrease and the slight slump was due almost entirely to a slackening of production on the new Willys-Knight "70", due to lack of materials, as announced by President John N. Willys.

The Chevrolet Ohio Motors Co., Electric Auto-Lite and Bock Bearing company were among those whose payrolls have increased in the last few weeks.

Supply of labor is plentiful. Sales in the small towns and adjoining country continue good.

Timken Bearings Net Up

CANTON, OHIO, Mar. 9—Net profit of Timken Roller Bearing Co. for 1925, after depreciation, interest and Federal taxes, was $8,088,338, or $6.73 per share on 1,200,882 outstanding no par capital stock, comparing with $5,805,686, or $4.38, in 1924. After payment of $4,803,528 capital stock dividends, surplus was $3,284,810, against $1,004,358 at the end of 1924.

The balance sheet shows cash $590,889, against $523,949 for 1924; securities, $11,310,596, against $7,695,228; notes and accounts receivable, $1,745,907, against $1,680,667; inventories, $5,435,890, aginst $1,382,735; accounts payable, $1,136,544, against $695,282.

Charles R. Greuter

Greuter With Stutz

Veteran Engineer is Designer of Overhead Camshaft 8

INDIANAPOLIS, Mar. 10—Exceptional interest is attached to the announcement that Charles R. Greuter, better known as "Pop," has joined the factory force, of the Stutz Motor Car Co. of America, Inc., and will guide the production and perfection of the new Stutz vertical eight engine. Not only is Mr. Greuter one of the best known of the veteran engineers of the industry, but it is now disclosed that he is to be credited with the fundamental design of the Stutz eight engine, on which he has been working for years.

F. E. Moskovics, president of the Stutz company, and Mr. Greuter are old friends and engineering associates. Mr. Greuter began pioneer work on overhead camshaft engines in 1902, after experience with other types dating from 1896. His overhead design was used by the Matheson Motor Car Co., Ltd., with which he was connected from 1904 to 1914. After a period of experimental work in 1920 he went with the Excelsior Motor Mfg. & Supply Co. of Chicago and began developing his present engine design.

New Stewart Truck

BUFFALO, N. Y., Mar. 10—Stewart Motor Corp. has brought out a 2½-ton capacity, fast, heavy-duty truck with six-cylinder, 3⅝ x 5 in. Lycoming engine.

The new chassis, which lists at $3200, is known as Model 19 and takes the place of Model 7X which has been discontinued. The standard wheelbase is 165 in.

Legislatures Study Automotive Bills

Bus, Truck, Gasoline, Sales and Liability Insurance Questions to be Settled

NEW YORK, Mar. 8—Recent legislative developments of interest to the automotive industry, according to Russell Huffman, secretary of the National Automobile Chamber of Commerce legislative committee, include a Kentucky law raising the gasoline tax to five cents, and a bill which would tax 30-passenger buses $15 per seat, plus $2 per hundred pounds gross weight. Added to the high fuel tax, this would make the bus pay about $1000. Kentucky also has a bill to reduce the width of buses to 90 inches and of trucks to 84.

In none of the eight legislatures now in session have weight reduction bills yet appeared but a Massachusetts bill would permit tractors with semi-trailer units to carry 40,000 pounds.

Would Increase Gasoline Tax

Mississippi would raise the fuel tax from four to five cents and Virginia may fix it at four and a half. New York has a 2-cent bill but its chances are not good.

New Jersey would increase truck registration fees, in some instances doubling the fee on a 5-ton truck, but present fees are low.

Compulsory automobile liability insurance bills have appeared in New York, New Jersey, Mississippi and Virginia. Indications are that they will not be passed in the latter two states, and may not pass in the former two.

Georgia has just passed a law requiring a 2 per cent sales tax on the gross amount of motor vehicle sales, to be collected by the dealers.

Court Makes Decision in American Bosch Suit

NEW YORK, Mar. 10—The United States District Court has dismissed the suits brought by Otto Heins and Albert Klein against the American Bosch Magneto Corp. and the plaintiffs will appeal to the United States Supreme Court.

These suits, filed early in 1920, alleged conspiracy in the sale of the American Bosch Magneto Corp. by the alien property custodian. Motions to dismiss before trial were based on the claim that both suits were barred by the Berlin Treaty of Peace between the United States and Germany, and that they contravene the trading with the enemy act. At the same time the plaintiffs moved to amend their complaint to bring in new defendants, but this motion was also denied.

In behalf of the plaintiffs it was said today that the dismissal would satisfy their desire for an opportunity to bring the suit before the Supreme Court as soon as possible.

Chrysler Common on $3 Yearly Basis

Company Reports Net Profits for 1925 as $17,126,135—$5.67 a Share

NEW YORK, Mar. 9—Another milestone in the rapid advance of the Chrysler Corp. was passed today when the directors declared an initial quarterly dividend of 75c a share on the common stock, placing the shares on a $3 annual basis. This is equivalent to $12 a share annually on the old stock outstanding before the four-for-one split-up. Full preferred dividends for the year were declared in advance.

The phenomenal growth of earnings of the corporation is shown by the statement for 1925, which reports net profits for parent and subsidiary companies as $17,126,135, against $4,115,540 for Maxwell Motor Corp., the predecessor company, in 1924 and $2,677,851 in 1923. The net income for the last year, after dividend requirements on the $8 preferred shares outstanding, was equal to $5.67 a share on the common stock outstanding.

Asset Position Strong

The consolidated balance sheet as of Dec. 31, 1925, showed current assets of $38,733,218, against $23,029,390 for the predecessor company as of Dec. 31, 1924; current liabilities, $10,712,808, against $6,763,494, leaving net working capital, $28,021,130, against $16,265,904. Cash at the end of 1925 totaled $4,643,101, against $5,680,610 at the end of 1924, while in addition at the close of 1925 Chrysler had $13,391,590 in marketable securities.

The initial common dividend is payable April 2 to stockholders of record Mar. 19, while the preferred dividends will be distributed in $2 quarterly instalments on April 2, June 30 and Sept. 30, 1926, and Jan. 3, 1927.

Companies Absorb 2% Tax

NEW YORK, Mar. 10 — Companies which have to date announced a 2 per cent reduction in prices on passenger cars to the consumer as a result of the new revenue act include:

Buick, Cadillac, Chandler-Cleveland, Chevrolet, Chrysler, Dodge, Flint, Ford, Franklin, Hudson, Hupp, Marmon, Nash, Oakland, Olds, Packard, Paige-Detroit, Reo, Rickenbacker, Studebaker and Willys-Overland.

Jordan Raises Prices

CLEVELAND, Mar. 11—An increase in prices in the J-8 series is announced by the Jordan Motor Car Co., Inc., as follows:

	New Price	Old	Increase
4-pass. Roadster	$1845	$1695	$150
4-pass. Victoria	1945	1845	100
5-pass. Sedan	1945	1845	100

HUDSON ANNOUNCES REDUCTIONS OF $50

DETROIT, Mar. 9—The Hudson Motor Car Co. announced today a reduction of $50 in prices of the Essex coach and the Hudson coach and brougham, the sedan remaining unchanged.

The new delivered prices, incorporating the reductions, will be announced individually by distributors and dealers in the various zones established under the Hudson plan. It was said at the factory that these reductions in some cases would be more than $50, depending upon the locality.

Electric Storage Has Biggest Year

PHILADELPHIA, Mar. 11—According to the annual report issued last night, the Electric Storage Battery Co. in 1925 did the largest business in its history. The report shows gross sales, less cost of manufacture, including all expenses incident thereto, of $13,980,160, an increase of $1,857,700 over 1924. This figure was likewise in excess of the 1920 record of $12,134,615.

Net income, before Federal taxes, was $8,626,106, an increase over 1924 of $1,415,224. After estimating Federal taxes and deducting dividends on the small amount of preferred stock outstanding, there was available for dividends on the common stock $7,569,826, equivalent to $9.44 a share on the 801,917 shares of outstanding common stock. The company earned $7,94 a share in 1924.

Current assets are $29,311,636 and current liabilities, $5,466,967.

Gardner Has New Sedan

ST. LOUIS, Mar. 11—Gardner Motor Co., Inc., has brought out a seven-passenger sedan on a 135-in. wheelbase, eight-cylinder chassis. This model has a 10-in. longer wheelbase than other Gardner eight models and the bore of the engine is slightly larger, 3¼ as compared with 3⅛ in., making the piston displacement 298.6 cu. in. The finish of the body is two-tone lacquer and the upholstery mohair.

Equipment furnished on this model includes five Disteel wheels, front and rear bumpers, automatic windshield-wiper, stop-light, shock absorbers all around, thermostat, coincidental lock, rear-vision mirror, extra tire, tube and cover.

Bilek District Manager

HARRISON, N. J., Mar. 9—Driver-Harris Co. announces the appointment of J. C. Bilek as Chicago district manager. He has been with this concern 16 years and has been handling the New York territory. H. D. Tietz will be associated with him in Chicago.

N.A.C.C. Establishes Electric Truck Body

Committee to Take Over Work of Electric Truck Makers Association

NEW YORK, Mar. 9—Establishment of an electric truck committee to promote the use of electric trucks and handle other problems was decided upon at a meeting of the electric truck manufacturers called by the National Automobile Chamber of Commerce here recently.

At the same time the Electric Truck Manufacturers Association voted to disband and transfer all activities and subcommittees to the new committee. The arrangement goes into effect after the Atlantic City show of the National Electric Light Association May 21-28, for which the E.T.M.A. has rented space on a cooperative basis.

Whitney Elected Chairman

E. R. Whitney, president of the Commercial Truck Co. of Philadelphia, who was president of the manufacturers association, was elected chairman of the N.A.C.C. Electric Truck Committee. Others who were present at the meeting, who are members of the new committee, are: C. A. Ward, president, Ward Motor Vehicle Co.; G. A. Freeman, vice-president, Walker Vehicle Co.; E. A. Fitts, Autocar Co.; P. Hahls, P. B. Electric Vehicles, Inc.; and G. M. Keller, Steinmetz Electric Motor Car Corp.

A definite field for use of electric trucks has developed in the cities, where the economics of electric operation give it preference over horse-drawn vehicles. An educational campaign, bringing out facts in favor of electric operation, will be conducted by the N.A.C.C. in cooperation with the National Electric Light Association, the Society for Electrical Development and other organizations.

One of the important problems upon which electric truck manufacturers are working is the establishment of a standard cost accounting system. Forms for this purpose are being prepared by a committee of which G. A. Street, of the Walker Vehicle Co., is chairman.

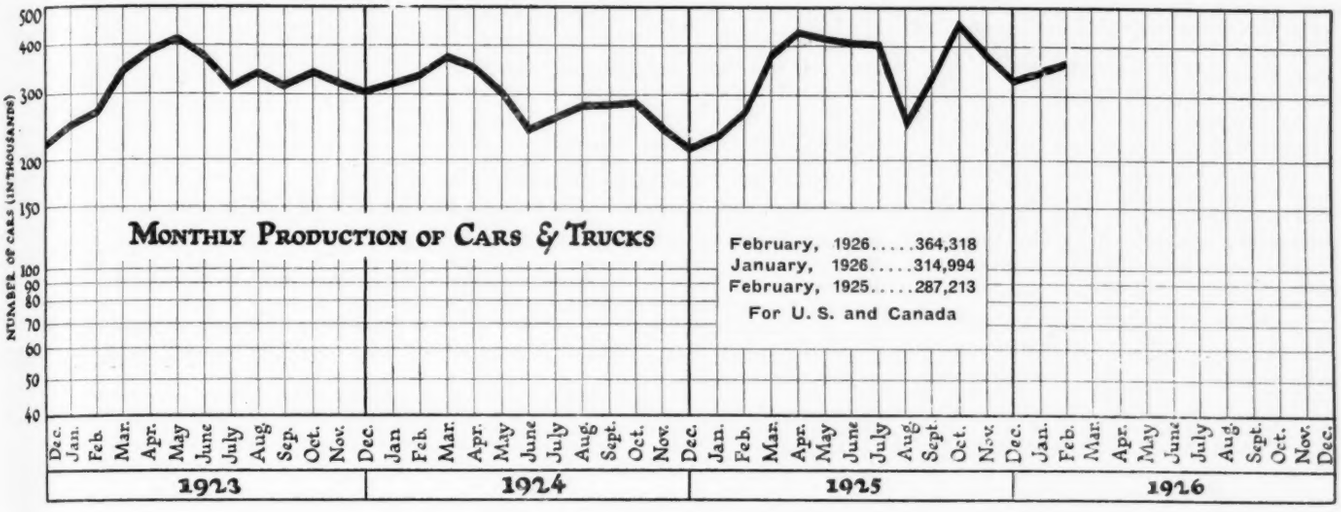
Monarch Tractor Elects

SPRINGFIELD, ILL., Mar. 10—Manufacture of tractors will commence April 15 by the Monarch Tractor Corp., which recently voted to remove to this city from Watertown, Wis.

At a stockholders meeting, held here, the following directors were elected: R. C. Lanphier, J. P. Clayton, A. D. Mackie, and E. E. Staley, all of Springfield; R. W. Gotshall, and H. B. Baker, both of Peoria, and F. B. Cadwell, of Chicago.

At a subsequent meeting, the directors elected the following officers: President, R. W. Gotshall; vice-president, R. B. Baker; secretary-treasurer, Owsley Brown; chairman of the board, F. B. Cadwell.

February Shows Large Gain in Production



Voisin Sees Lesson in American Bodies

Manufacturer Ridicules French Way of Building Coaches—Urges Changes

PARIS, Mar. 3 (*by mail*)—Praise of American body-building methods, and scathing criticism of French coach-builders are outstanding features of a booklet produced by the Voisin Automobile Co. of Paris. It is believed to have been written by Gabriel Voisin, artist, pioneer aviator, airplane builder, and now automobile manufacturer. The book is written in such an outspoken and fearless manner that an important association of French body-builders has called a special meeting to discuss it and is now considering the advisability of a joint reply. Voisin says:

Superior Points Noted

In America certain firms produce 3000 bodies per day, and the 3000th body is exactly like the first. They are light, because they have been transformed, little by little, with a definite end in view. They are extraordinarily cheap, because the shapes have been obtained mechanically and not by weeks of hand labor off bits of sheet steel. The bodies are roomy and silent, and they are to be found on all American cars. These automobiles in a few days could submerge the entire French automobile industry like a tidal wave, if import duties were suddenly removed, and if American mechanical construction could stand up on French roads in the hands of French drivers.

We have tested 20 different makes of American cars, we have unreservedly admired their qualities, and we have reached the following conclusions: An American automobile of a given piston displacement has a weight half that of a French car. The stamped-out bodies, assembled on a very light frame, cannot be produced by any French firm, with the exception, of course, of those equipped with American machinery and using American methods.

The French practice of delivering bare chassis to small firms for bodies to be built on them individually is vigorously attacked.

These body-builders live from hand to mouth; they are puppets of capricious clients, for they have not the financial means to refuse an order from a customer who wants his own type of fenders, his own upholstery and a body-line which he considers beautiful. After being built under these conditions, the automobile is sent back to the manufacturer for a final revision. Its storage batteries are inaccessible; the body cannot be taken off; there are gaps in the floor boards; extra weight has been added in the form of spare wheels and tool boxes placed indiscriminately and without any thought of balance; the baggage rack overhangs at the rear and the owner has the idea that he can use his car, either loaded or empty, that is, with variations in weight on the rear as high as 1100 pounds, without changing the resistance or the flexibility of the springs.

S. A. E. TO SET UP PRODUCTION SECTION

NEW YORK, Mar. 11—The Society of Automotive Engineers announces that it is entering the field of production standardization work by establishing a production division, in charge of production experts, whose work will relate to production equipment and methods.

The Standards Committee now consists of about 275 members, grouped into 25 divisions, classified according to type of vehicle and major automotive component parts, units and materials.

Weller Goes to Acme Truck

DETROIT, Mar. 11—J. H. Weller, whose appointment as general manager of the Acme Motor Truck Corp., was recently announced in these columns, has resigned his position as vice-president of the Gray Mfg. Co., effective Mar. 1, to take up his new duties.

Spicer Mfg. Earns $5.04 on Common

Gain is Shown From $728,835 to $1,583,131 in Surplus—Dividend Declared

SOUTH PLAINFIELD, N. J., Mar. 9—For 1925, Spicer Mfg. Corp. reports net income of $1,810,183, after charges, equal, after preferred dividends, to $5.04 per share on 313,750 common outstanding, comparing with $968,835, or $2.32, in the preceding year. The income account shows that surplus increased from $728,835 to $1,583,131.

Current assets as of Dec. 31 were $2,979,248, against $4,581,988 at the end of 1924, and current liabilities $1,252,125, against $1,584,996, leaving net working capital of $1,727,123, against $2,996,992. Cash on hand decreased from $651,041 to $479,231, and funded debt from $780,000 to $464,500.

Expansion in England

C. A. Vane, president, cites the fact that in 1925 the company sold the Sheldon Axle & Spring Co., and extended its operations in the universal joint and propeller-shaft field by purchasing an interest in Hardy-Spicer Co., Ltd., Birmingham and Coventry, England, so that merchandise may be furnished to the English and Continental trade direct from the English plant.

The new plant built for the Paris Mfg. Co. at Reading, Pa., enables the manufacturing of truck and bus frames and general metal stampings in much larger quantities. Salisbury Axle Co. is operating on a profitable basis. Operations of the Hartford Auto Parts Corp. have been merged with the parent company, and the Hartford concern has been dissolved.

The regular Spicer dividend of 2 per cent on preferred has been declared, payable Apr. 1 to holders recorded Mar. 20

Electric Auto-Lite Business Up 51%

TOLEDO, Mar. 8—The Electric Auto-Lite Co. today reported net profit for 1925 of $2,526,902, before Federal taxes, equivalent to $10.10 a share on the 250,000 shares of capital stock outstanding. Gross business done was $12,489,382, an increase of 51 per cent over 1924.

Depreciation of $260,524 on plant and equipment was charged off in 1925. Assets totaled $5,875,258. Surplus was $2,210,081. Dividends paid to stockholders totaled $1,625,000, and Federal taxes, $322,468 in 1925.

Building Program Under Way

A building program including two 4-story units and a 1-story machine shop, together with complete revamping of heating and power systems, is now under way in anticipation of new contracts and the merging of the starting, lighting and ignition business of the American Bosch Magneto Corp. and the Gray & Davis, Inc., division, which is expected to be consummated Apr. 1.

In 1925, the company built 413,752 starting and lighting systems, as compared with 249,652 in 1924. President C. O. Miniger stated that business so far this year was about 2 per cent better than for the corresponding period in 1925.

The American Enameled Magnet Wire Co., a subsidiary, shipped 3,498,676 lbs. of wire in 1925, against 2,403,684 lbs. in 1924. In the last year, important changes have been made in the installation of complete drawing, coil-making and flexible wire departments.

Chandler Motor Shows Net Profit of $1,330,916

CLEVELAND, Mar. 11 — Chandler Motor Car Co. for 1925 reports net profit of $1,330,916, after depreciation, Federal taxes, etc., or $4.75 a share on 280,000 no par capital stock, comparing with $1,348,420, or $4.81, in 1924.

Total assets increased from $12,306,994 to $13,107,781, and surplus from $4,091,604 to $4,352,606. Cash on hand Dec. 31 was $531,846, compared with $395,650 at the end of 1924.

C. E. Cunningham Dies

ROCHESTER, Mar. 9—Charles E. Cunningham, who at the time of his retirement 20 years ago was president of James Cunningham Son & Co., died here Mar. 3, aged 73 years. He was a son of the late James Cunningham, founder of the firm.

Hupp Reports Sales and Profit Gains

DETROIT, Mar. 6—Hupp Motor Car Corp. consolidated income account for the year 1925, reports total sales of $43,847,198, as compared with $32,320,706 for 1924, and net profit of $3,862,279, against $1,613,600 for 1924. Earnings per share of common stock were 42.27 per cent as compared with 17.66 per cent the year previous.

Cash on hand increased from $1,403,973 to $2,077,919 and inventories declined from $6,195,369 to $6,020,716.

Graham Truck Shipments 4375 to March 1, 1926

DETROIT, Mar. 8—Shipments of Graham Bros. trucks in the final week of February, 1926, totaled 576, against 316 in the corresponding week of 1925. Total February shipments of trucks by this division of Dodge Bros., Inc., amounted to 2552 units, as compared with 1257 in February, 1925, an increase of 103 per cent.

Total factory shipments for the first nine weeks of this year were 4375 units, a gain of 78 per cent over the same time last year, when the total was 2497.

Developments of the Week in Leading Motor Stocks

NEW YORK, Mar. 11—Motor shares last week recovered in sympathy with the rest of the market, and the leading active issues were about five points above the low prices registered on the recent break. The action of the group during the slump caused a great deal of favorable comment in trading circles as it had been expected that the first sign of weakness in the speculative structure would be the signal for heavy selling of the motors, which have had a conspicuous place throughout the current bull market. There was some question in the minds of observers as to how well such selling would be absorbed. The heavy turnover in many of the leaders showed that the bears were freely offering the motors, but there was good buying support on the way down with no evidence of extensive liquidation.

While the motors have not recovered all the ground lost, it is apparent that many of them, notwithstanding their sharp advance, are still selling at prices fully justified by last year's remarkable earnings record and current bright prospects for business in the early months of this year. With business running at an even higher rate than in the early months of 1925, prospects of record earnings during the first six months of 1926 will undoubtedly prove a stabilizing influence on prices during any period of irregularity in the general list.

Strong pools are at work in several issues; among those frequently mentioned under such sponsorship are Hudson, Studebaker, Dodge, Chrysler and General Motors. Hudson's ambitious manufacturing program for the next few months is fostering a great deal of speculative enthusiasm and reports of buying for control by other prominent motor interests, which may or may not be true, give those who are looking after its market destinies a good basis to work on. The uncertainty surrounding plans of the management to give shareholders a larger share in the company's prosperity has placed Hudson in the "mystery" class.

Studebaker in Line With Book Values

Buying of Studebaker has been based on the company's strong position as revealed by the annual report for 1925 and the fact that this is one of the few motor stocks still selling closely in line with actual book values. Studebaker's business last year was close to the record established in 1923, and in both sales and net earnings the company showed substantial gains over 1924. It has accumulated more than $30,000,000 in surplus, and there is some talk in the financial district of plans of distributing this accumulation in the form of a stock dividend later in the year.

The action of Chrysler directors in placing the stock on a $3 dividend basis had little effect on the stock on Tuesday. In some quarters it is believed that this action will detract considerably from its market popularity as a speculative vehicle, as it takes away some of the mystery which has shrouded this issue concerning plans of directors with regard to last year's phenomenal earnings, although the management promises still better things if present trade prospects are realized. With a $3 dividend rate, the stock is selling at an attractive price.

There was good support of Dodge Bros., a stock in the lower thirties. This stock broke rather badly in the preceding week, and this was attributed to the fact that it is still an unseasoned issue and there has not been sufficient time to secure as wide a distribution of it as of some of the other motors. In relation to earnings in 1925, Dodge shows the highest ratio, with profits equal to approximately 18 per cent on the market price.

Insiders are still bullish on General Motors, and argue that, with reasonably favorable general market conditions, it should sell at 150 by late spring on dividend prospects and earnings. It is estimated that the big corporation will show more than $6 a share for its common in the first three months, which would nearly cover the entire $7 dividend on this issue for the year. Further extra distributions are in prospect.

While it is generally conceded that the future course of motor stocks will be influenced by the character of the rest of the market, the strong position of the industry gives promise that this group is in position again to assume leadership if the market has its normal spring rise.
—E. S.

Truck and Taxicab Operation Discussed

Pennsylvania Section, S. A. E., Hears Day and Mason Outline Methods

PHILADELPHIA, Mar. 10 — Fleet operation was the topic of the meeting of the Pennsylvania Section of the S.A.E. held in this city last night. The subject was discussed from two angles, that of truck and of taxicab operation.

T. O. Day, master mechanic, Yellow Cab Co., Philadelphia, described the methods employed in keeping the nearly 1000 Yellow cabs on the streets in good operating condition. He told of the mental, physical and psychological tests which are given to prospective drivers to determine whether or not they have the necessary characteristics to make good cab drivers, the methods used in paying drivers and the various incentives offered for careful driving. The cabs undergo detailed mechanical inspection and repair at regular intervals, and the means employed to assure careful workmanship were described in considerable detail.

Col. Mason Speaks

Col. R. O. Mason, superintendent of transportation, Philadelphia Electric Co., presented a detailed analytical outline of the facts which must be ascertained to determine how well a fleet of trucks is being operated. Following this outline, he made a number of suggestions as to how many of the items involved in maintaining a fleet at high operating efficiency might be handled.

T. J. Litle, Jr., National president of the S.A.E., was present at the meeting and made a few remarks, and J. A. C. Warner told the members something about the Annual Summer Meeting and the Aeronautical Meeting, the latter to be held in this city.

At the close of the meeting Mr. Day furnished transportation to take a number of those present to the Yellow Cab Co.'s main dispatching station at Broad and Race Sts., where they were shown how telephone calls for cab service were handled.

Grant Reports Western Business Outlook Good

DETROIT, Mar. 8—Present and prospective business conditions in the Middle West and on the Pacific Coast are good, according to R. H. Grant, vice-president and general sales manager of the Chevrolet Motor Co., who, with a group of other Chevrolet officials, has returned to Detroit from an extended trip.

With Mr. Grant on the tour were C. E. Dawson, assistant general sales manager, R. K. White, sales promotion manager, J. P. Little, manager of the parts and service division, W. G. Lewellyn, assistant sales promotion manager, William A. Blees, Jr., manager of the certificate sales division, and Sidney Corbett, manager of the fleet sales division. J. E. Grimm, Jr., advertising manager, joined the party on their return trip.

After a short stay in Detroit, the party will leave for Boston and will then turn southward and westward ending their meetings in Louisville Apr. 17.

CHRYSLER PREDICTS GOOD WESTERN TRADE

NEW YORK, Mar. 8—Walter P. Chrysler, president of Chrysler Corp., returning from a five weeks' visit to the Pacific Coast during which he conferred with car distributors, dealers and other business men, says the West expects a continuance of good business throughout 1926. He found prosperity through the Pacific Northwest, with agriculture, a true barometer of general conditions, doing well.

California's crops are assured by normal rainfall which has been lacking in recent years, and the wheat crop outlook in the great wheat states is described by Mr. Chrysler as very good, while Middle Western railroads are doing excellent business.

Stocks in the hands of the 4,300 Chrysler distributors and dealers throughout the country are said to be below normal, with demand beyond expectation for this time of year.

Chevrolet Exports Gain 700 Per Cent Since 1922

DETROIT, Mar. 8—The Chevrolet Motor Co.'s export business has expanded nearly 700 per cent in the last four years, according to an announcement by company officials today. The figures for passenger cars and trucks appear subjoined.

Year	Passenger Cars	Trucks	Total
1922.....	11,588	.....	11,588
1923.....	18,773	3,021	21,794
1924.....	22,433	6,203	28,636
1925.....	63,552	17,971	81,523

To handle its increasing foreign business, the company has an export assembly plant at Bloomfield, N. J., and European assembly plants at London, Copenhagen and Antwerp, in addition to two receiving plants, one at Barcelona, Spain, and the other at Hamburg, Germany.

Building Dodge Trucks

EVANSVILLE, IND., Mar. 10—Graham Bros.' local truck plant has started building Dodge ¾-ton trucks, in addition to the regular 1 and 1½-ton Graham models, according to announcement by W. R. Heilman, sales manager for southern territory.

Work is progressing so favorably on the three new plant units, that it is expected they will be in operation within 30 days, J. A. Merchant, assistant secretary, declared.

February Rim Output 2,168,223

Increases Noted Over Preceding Month and Corresponding Month Last Year

CLEVELAND, Mar. 11 — February rim production figures, just announced by the Tire & Rim Association of America, Inc., together with comparative figures for February, 1925, for principal sizes, are as follows:

Size	Feb. 1926	Feb. 1925
Clincher Rim		
30 x 3½	315,213	509,469
Balloon Rims		
28 x 3½	783,747	359,258
28 x 4	209,626	222,432
29 x 4	374,846	112,666
30 x 4½	18,572	45,177
30 x 5	31,401	30,994
31 x 5	65,071	33,908
High Pressure Rims		
30 x 3½	9,046	74,441
32 x 4	19,625	16,981
32 x 4½	38,217	31,376
Truck 20"		
30 x 5	27,629	69,279
Truck 24"		
36 x 6	9,745	5,790

Total rims inspected and approved in February, 1926, totaled 2,168,223, as compared with 1,975,166 in February, 1925, and 1,980,481 in January, 1926.

Multibestos Co. Gets Out New Brake-Lining

WALPOLE, Mass., Mar. 11—A new brake-lining specially designed for use on buses, trucks and cabs, on which classes of vehicle the lining is subjected to the hardest service, has been placed in production by the Multibestos Co. of this place and will be known as Busduty Multibestos. It is claimed for this new lining that it is strong, tough and long-wearing; that it is not affected by weather conditions and gives positive brake action even when wet.

This lining contains 20 per cent more yarn than ordinary lining and is said to wear at least 50 per cent longer. It is believed that the new lining will appeal to fleet owners because it will reduce the frequency of lay-ups of commercial vehicles for the purpose of relining the brakes.

Reo Extra Dividend

LANSING, MICH., Mar. 9—Directors of the Reo Motor Car Co. have declared an extra dividend of 1 per cent in addition to the regular dividend of 2 per cent, payable Apr. 1 to holders of record of Mar. 15. In the two previous quarters an extra dividend of 3 per cent was paid.

Drystadt is Promoted

DETROIT, Mar. 11—Nicholas Drystadt has been appointed general service manager of the Cadillac Motor Car Co. Mr. Drystadt comes from the Chicago branch of the company, where he was in charge of service. He is succeeded at Chicago by C. H. Trask.

Men of the Industry and What They Are Doing

Dahl to Coordinate Bus and Truck Men's Efforts

A committee consisting of T. R. Dahl, vice-president of The White Co., as chairman, D. C. Fenner of Mack Trucks, Inc., and W. H. Brearly of The Autocar Co., will represent the truck committee of the National Automobile Chamber of Commerce at the Washington hearing Mar. 27 on the Ainey bill for regulation of motor trucks and buses in interstate service.

Previous to the hearing the committee will be active in attemping to co-ordinate the views of the different branches of the industry so that something in the nature of a united front may be presented.

As matters stand now, the truck men oppose the bill and bus interests favor regulation.

The independent bus interests in New England will oppose the bill unless it is amended to include a "grandfather" clause which will protect the interests of independent lines now in operation.

Cozette Comes to U. S.

Rene Cozette, chief engineer of the Cozette Carburetor Co. of Paris, sailed for New York on the Aquitania yesterday.

M. Cozette, who is a recognized expert on carburetors and supercharging, will make his headquarters at Flint, Mich., and will equip the Miller racing car owned by Albert Champion, with his type of supercharger. M. Cozette intends to remain three months in America, returning to France immediately after the Indianapolis race.

Robbins Representatives Abroad

E. V. Jolliffe of the H. M. Robbins Co., Detroit, has gone to Cuba to conduct a general market survey of the lines handled by the company there and to establish distributing connections. While in Cuba, Mr. Jolliffe will represent the H. M. Robbins Co. at the roads congress to be held in Havana.

D. B. Richardson, of the same company, is returning to South America in the interest of the several Robbins lines.

Ellis is Honored

George L. Ellis, general sales manager for Canada for the Gotfredson Truck Corp., Ltd., was tendered a complimentary banquet prior to his departure for a tour of the United States in the interests of the corporation. He was also presented with a cigarette case, and Mrs. Ellis with a basket of roses.

Stoddard in California

H. G. Stoddard, vice-president, Wyman-Gordon Co., Worcester, Mass., manufacturer of drop forgings, is spending March in California.

SEES GERMAN CAR TRADE BEHIND U. S.

MILWAUKEE, Mar. 8—Germany is 10 to 12 years behind the United States in its automotive industry, according to Otto Kleyer, partner in and son of the president of the company manufacturing the Adler car, which is the largest motor car company in Germany.

Mr. Kleyer came to New York to attend the Second World Motor Transport Congress early in January, and has since been studying financial and manufacturing conditions of the automotive industry in the largest plants in America.

Referring to manufacturing conditions in Germany, Mr. Kleyer said that "the motor car industry is developing and improving rapidly. Foreign cars are not offering much competition because of the high protective duty imposed upon them. The cost of a Ford is about $1200 while all other cars are sold at the same price as our own, extending from $1900 to $50,000."

Moskovics Delivers Address

F. E. Moskovics, president, Stutz Motor Car Co. of America, Inc., was the speaker at a big civic meeting held in Oil City, Pa., recently under the auspices of the Chamber of Commerce with the Rotary and Kiwanis organizations joining forces to make the affair representative. His subject was "The Automobile as a Factor in Civic Progress."

American Bosch Promotions.

Charles F. Shedd, formerly of the Detroit branch, has been appointed Chicago branch manager for the American Bosch Magneto Corp.

E. H. Thresh has been promoted from cashier to assistant branch manager at Chicago. Elliott S. Hanson, whom Mr. Thresh succeeds, is now Detroit manager, and W. R. Cogger, former Detroit branch cashier, has become assistant branch manager there.

Small and Henderson in West

F. M. Small, president, and R. P. Henderson, general sales manager of Martin-Parry Corp., have gone to California on a month's business trip. On the way out, they visited the Martin-Parry branch assembling plants at Portland and Seattle.

The itinerary for the return trip includes stop-overs at 10 or 12 western and mid-western branches. Most of the time in California will be spent at the San Francisco and Los Angeles assembling plants.

Croninger Is New Yellow Truck Vice-President

R. Harry Croninger has been elected vice-president of the Yellow Truck & Coach Mfg. Co., it is announced by John A. Ritchie, president of the company.

Mr. Croninger, who will immediately assume the duties of director of maintenance and service, has been connected with the Yellow interests in Chicago for the last four years as assistant general manager. The new office of director of maintenance and service has been created, following a program of expansion.

One of the best-known figures in the American automotive industry, Mr. Croninger pioneered the early developments of motor cars in this country, assisted to found the Stoddard-Dayton Co., joining that organization in 1903. He has been connected variously with the Pennsylvania Auto Motor Co. and the Alco division of the American Locomotive Co. During the war he had extensive manufacturing interests in Dayton, Ohio.

N. A. C. C. Officials Sail for Cuba

Alfred Reeves, general manager of the National Automobile Chamber of Commerce, H. H. Rice of General Motors Corp., and an N. A. C. C. director, and D. C. Fenner of Mack Trucks, Inc., member of the chamber legislative and motor truck committees, sailed today for Cuba where they will be joined by Roy D. Chapin of the Hudson Motor Car Co. and John N. Willys of Willys-Overland Co., also directors of the chamber. George F. Bauer, secretary of the foreign trade committee, is already in Cuba.

Their chief purpose is to assist in planning the outgo of the $100,000,000 good roads bond issue recently authorized by the Cuban Government.

Morris is Promoted

R. H. Mulch, vice-president and general manager of the Flint Motor Co., announces the appointment of George R. Morris as sales manager of that company. He has been assistant sales manager for some time.

Mr. Morris has been actively engaged in sales work for more than twenty years and was for many years associated with General Motors Corp. He has already entered upon his new duties at the Flint executive offices, Flint, Mich.

Halligan on Tour

Comptroller J. E. Halligan, of the H. H. Franklin Mfg. Co., is visiting a number of Franklin dealers in the southwest and middle west during March. Mr. Halligan's trip is in keeping with the company's policy of having factory executives maintain first-hand contact with conditions in the field.

Packard is Awarded Government Contract

Largest Order of Airplane Engines Since War is Placed for Navy

WASHINGTON, Mar. 8—The Packard Motor Car Co. has received a Government contract to the value of $2,364,000 for 150 airplane engines of the 800-hp. "2500" Series. This award, which is the largest single aviation contract made by the Government since the war, completes the placing of orders for Naval Air Service equipment under the $6,500,000 appropriation.

Secretary Wilbur who announced the Packard contract late last week has authorized orders covering the manufacture of 116 planes and 261 engines. In addition to the 150 "2500" engines, the Packard company has received orders for 75 engines of the 500-hp. "1500" Series, while the Wright Aeronautical Corp., Paterson, N. J., received a contract for 36 "Tornado" aero engines.

Under Development for 3 Years

The "2500" Series engines covered by the newest contract have been under development by the Packard company, in cooperation with Navy engineers, for more than three years. They will be used in heavy bombing, scouting, and torpedo planes which will operate from the Navy's two latest aircraft carriers, the Lexington and Saratoga. The 75 "1500" power plants will be mounted in fighting planes to be included in part of the air fleet operating with the converted battle cruisers.

It is said that additional contracts will shortly be awarded to provide 127 more planes at an outlay of about $3,700,000. These machines will include 100 bombers and 27 Loening amphibians.

Contracts already awarded for the 116 planes will be divided as follows: 27 Boeing patrol ships; 35 Curtis fighting planes; 24 Martin scouting-torpedo planes; 20 training planes and 10 Loening amphibians. With the exception of a few amphibians and the order of training planes, the balance of the machines will be employed to equip the Navy's two aircraft carriers.

Automotive Accessories Are in Demand Overseas

NEW YORK, Mar. 10—Analysis of the demand for American automotive accessories in foreign markets, as set forth in a recent report of the United States Department of Commerce, including 21 European and South American countries, shows these results:

Spotlights and motometers in 13 countries; rear view mirrors, 12; bumpers, 11; spare tires, 10; gasoline gages, 5; windshield wipers, 4; spare wheels, 3; shock absorbers, 3.

The following accessories were each in demand in one country: Side lights, clocks, inspection lamps, stop lights, trunks, smoking and vanity kits, power tire pumps and rear baggage-racks.

Several differences from the American market are revealed, such as the prevalence of open cars in many countries. In the Sao Paolo district of Brazil only 5 per cent are closed cars. In Argentina the law requiries two side lights. As a rule, magneto ignition is more popular in Europe and battery ignition in South America.

Moto Meter Income, Profit Up in 1925

LONG ISLAND CITY, N. Y., Mar. 10—The Moto Meter Co., Inc., reports, for the year ended Dec. 31, 1925, operating profit of $2,118,362, as compared with $1,541,996 in 1924. After all reserves for depreciation and taxes, net income was $1,794,592, against $1,284,685 in the preceding year.

Net income equals $5.08 a share earned on the 200,000 shares of no par value Class A stock outstanding, and to $3.91 a share earned on the 200,000 shares of Class B outstanding. After dividends, surplus in 1925 was $652,092, as compared with $159,685 in 1924.

For the final quarter of 1925, net income was $297,801, after all deductions, equal to $1.01 a share earned on the Class A stock and 47 cents a share on the Class B stock. In the final quarter of 1924, net income was $118,889.

National Tractor Meet Postponed Until Fall

NEW YORK, Mar. 11—The National tractor meeting, which was scheduled to be held in Chicago Mar. 25-26 under the joint auspices of the American Society of Agricultural Engineers and the Society of Automotive Engineers, has been postponed by agreement of the two societies.

After a careful canvass of the situation, it was decided that autumn would be a more suitable time for the meeting than early spring, and the dates for the fall meeting are to be announced later.

Spain-South America Air Service Planned

LONDON, Mar. 8—A new super all-metal flying boat is being constructed at Pisa, Italy, for an experimental air service between Spain and South America, it was announced last week.

Four Napier engines, having a total horsepower of 2000, will be built into the machine, which will be capable of carrying 12 passengers. It is said that the flying boat will be able to make a non-stop flight of 2000 miles.

New Radiator Cap

JAMESTOWN, N. Y., Mar. 11—The Ellison Bronze Co. is introducing a novelty ornamental radiator cap, done in bronze. The management expects to go into the market with heavy advertising in May and June.

U. S. Rubber Gains in Sales and Profits

Former Total $206,473,737, and Latter $17,309,870—$11.21 a Share Earned

NEW YORK, Mar. 10—The annual report of the U. S. Rubber Co. for 1925 shows a substantial increase in sales and net profit as compared with the preceding year.

Sales totaled $206,473,737, the largest since 1920, as compared with $172,219,353 in 1924. After allowing for all operating expenses, including reserves for depreciation and taxes, net income of $17,309,870 was available for dividends, against $8,368,035 in 1924. The 1925 net income is equal to $14.91 a share earned on the $81,000,000 capital stock outstanding, against $3.90 in 1924.

$3,000,000 Reserve Set Aside

The directors set aside $3,000,000 out of 1925 profits as a special reserve to be applied against the cost of crude rubber to be received in the current year. After such appropriation, there was a surplus of $9,082,352, which equals $11.21 a share on the common stock.

The general balance sheet shows the company had working capital of $124,703,000, as compared with $72,680,107 in 1924.

C. B. Seger, chairman of the board, in a statement to stockholders said:

The net income for 1925 does not include any income from rubber plantations owned by the company. Inventories of finished goods were valued at cost of production, which in all cases was substantially below the cost of replacement at the market prices for raw materials.

The operations of rubber plantations owned by the company produced substantial profits for the year, after providing adequate reserves for depreciation of plant and equipment, and amortization of cost of development, and for foreign income taxes.

Ford of Canada, Ltd., Employs 5638 Persons

FORD CITY, ONT., Mar. 10—With 5350 workmen on its payroll, the Ford Motor Co. of Canada, Ltd., this city, has more men employed at the present time than at any other time in its 22 years of existence, officials of the company state. There are also 288 men and girls on the office staff, making a total of 5638.

The demand for new models has exceeded estimates of the company, and, as a result, the factory will be continually busy for some time to come.

Chrysler Gets Plant Abroad

ANTWERP, BELGIUM, Mar. 8—Articles of incorporation for the Societe Anonyme Chrysler have been filed here.

The organization has been formed to take care of the distribution of Chrysler products in Europe. A 12-year lease on the old Ford assembly plant here has been taken.

Rubber Supply Ample for Next Six Months

Arrivals of Crude Are Heavy, and Tire Demand is Not Yet Strong

NEW YORK, Mar. 8—Sharp increase in crude rubber stocks since the end of last year is shown by a chart prepared by Henderson, Helm & Hammesfahr, Inc., whose weekly market letter explains that this increase began when rubber consumption was curtailed by tire manufacturers, and states that stocks are still increasing, due to the continued absence of manufacturers from the market.

In the last week considerable quantities have been resold in the London market, largely due to postponements requested by American consumers. The recent market has been erratic, prices fluctuating from 50 to 58 cents, with May on Saturday closing at 54.80 and July at 53.60.

Dealers' Stocks Not Large

It is believed that the reasonable expectation of a substantial amount of buying by manufacturers will not be fulfilled until some encouragement is given through increased tire sales. Dealers' stocks, according to the Henderson concern, are not large and the stocks being accumulated by manufacturers are regarded as necessary at this time of year. Given a few weeks of good weather, these stocks will fast disappear and manufacturing at capacity will be resumed. In the meanwhile, rubber may go lower, as arrivals are heavy. Indications are that for the next six months there will be ample rubber for all needs.

February shipments from the East were practically the same as January. This is accounted for by the additional releases under the Stevenson act. It is believed that shipments will come through now to the limit of the estates' capacity to produce, and there is nothing to indicate that this will exceed what the trade as a whole has calculated.

Coming Feature Issues of Chilton Class Journal Publications

MAY—Automobile Trade Journal—Biggest Market Issue.

May 6—Motor Age—Sales and Service Reference Number

Stromberg Earnings $629,681 in 1925

NEW YORK, Mar. 10—The Stromberg Carburetor Company of America, Inc., reports gross earnings of $1,574,876 for 1925, against $1,253,461 in 1924, and net profit of $629,681 after all deductions, against $561,797. The net profit for 1925 was equal to $7.87 a share earned on the 80,000 shares of capital stock outstanding, against $7.02 a share earned in 1924.

After payment of $479,754 in the form of cash dividends, the company's surplus was $149,927 for the year, increasing the profit and loss surplus to $3,205,379 at the close of 1925, against $3,031,249 at the close of 1924.

Indian Motocycle Dividend

SPRINGFIELD, MASS., Mar. 8—Directors of the Indian Motocycle Co. have declared regular quarterly dividend of 1¾ per cent on preferred, payable Apr. 1 to stock of record of Mar. 30.

Goodrich 1925 Net Profit $12,744,447

Net Sales $136,239,526—Common Earns $17.33 a Share

NEW YORK, Mar. 10—Net profit of B. F. Goodrich Co. and subsidiaries for 1925 after interest, depreciation, Federal taxes and reserve for contingencies was $12,744,447, equal, after preferred dividends, to $17.33 a share on 601,560 outstanding no par common and comparing with $8,822,504 or $10.57 on 601,400 shares in 1924.

Net sales increased from $109,817,685 to $136,239,526 and surplus from $6,362,354 to $9,227,027.

Total Reserve, $5,000,000

The reserve for contingencies, such as possible losses due to fluctuation in crude rubber prices, was increased $4,000,000 which, together with the amount set aside for contingencies a year ago, makes a total of $5,000,000.

Cash on hand Dec. 31 was $4,412,690 against $4,037,454 at the end of 1924. Total assets increased from $84,885,891 to $108,991,942.

Dunlap and Stern Speak

CHICAGO, Mar. 8—Definition of a "gyp" and the methods of elimination of the species, was the subject of Robert B. Dunlap, sales manager of the C. A. Shaler Co., Waupun, Wis., at the regular meeting of the Automotive Manufacturers' Association at the City Club last week. A discussion of the problem followed the address of Mr. Dunlap.

Merchandising was discussed by Sid Stern, editor of Automotive Merchandising, at the same meeting.

Calendar of Coming Events

SHOWS

Feb. 15-Mar. 15—International Automobile Show, Copenhagen, Denmark.

Apr. 3-14 — International Motor Car Show, Frankfort-on-Main, Germany.

May—International Street and Highway Traffic Safety Exhibition, City Hall, Vienna, Austria.

May 25—International Exhibition of Roads, Transport and Touring, Show Grounds, Argentine Rural Society, Palermo, Buenos Aires.

CONVENTIONS

Mar. 23-25—National Conference on Street and Highway Safety, Washington.

Apr. 21-23—American Welding Society, Engineering Societies Bldg., New York City.

May 13-15—American Gear Manufacturers Association, Tenth Annual Convention, Book-Cadillac Hotel, Detroit.

June 8-10—Automobile Body Builders Association, Detroit, Hotel Statler.

June 14-19 — Automotive Equipment Association, Mount Royal Hotel, Montreal, Canada.

June 16-18—Thirteenth National Convention, Society of Industrial Engineers, Philadelphia, Bellevue-Stratford Hotel.

RACES

Mar. 21—Los Angeles, Cal.

Apr. 15—Fresno, Cal.

May 1 — Races at opening of new Speedway, Atlantic City.

May 10—Charlotte, N. C.

May 30-31 — 500-mile race, Indianapolis.

June 12-13 — Rudge-Whitworth 24-hour stock car race, Le Mans, France.

S. A. E. MEETINGS

National

Mar. 25-26—Annual tractor meeting, in cooperation with American Society of Agricultural Engineers, Chicago.

June 1-4—Semi-annual meeting, French Lick Springs, Ind.

Sectional

Mar. 15—Cleveland.
Mar. 16—Buffalo, N. Y.
Mar. 25—Detroit.
Mar. 26—Chicago.
Apr. 7 — Milwaukee.
Apr. 8 — Detroit.
Apr. 8 — Indianapolis.
Apr. 19—Cleveland.
Apr. 22—Detroit.